April 14, 1958

Paper Trade Journal

Kraft Mill Odors — What U. S. mills are doing about the problem is detailed in the report of a plant survey.

White Water Tanks — Need for improvement in white-water tank design is discussed together with how to accomplish it.

Electrical Maintenance — How to get more productive maintenance for your electrical equipment and reduce the cost.

European Developments — Reports on the groundwood fraction mixing process and a new type of equipment for soaking logs.

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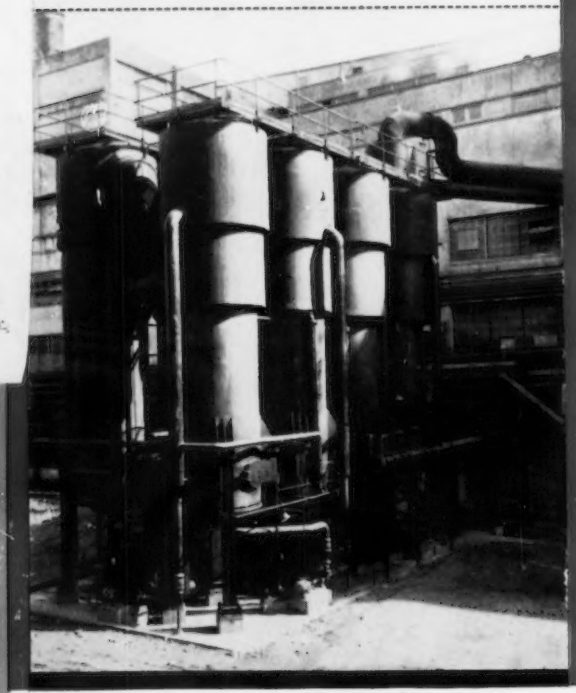

Crown Zellerbach Reduces Operating Costs with Swenson Evaporator System

Crown Zellerbach answers the need for greater operating economy with this modern septuple-effect system at their Camas, Washington, kraft pulp mill. It evaporates more water per pound of steam than the former unit and gives dependable, trouble-free service. This installation—like 90% of all such septuple-effect recovery systems—is Swenson-designed.

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"An Open Door" shows how efficient Swenson equipment opens the door to lower production costs. Write today. Swenson Evaporator Company, 15687 Lathrop Avenue, Harvey, Illinois.

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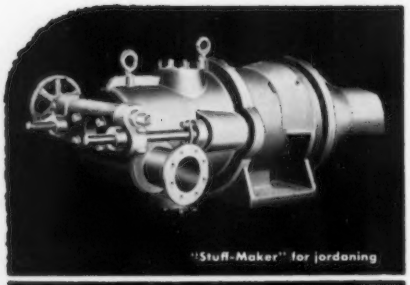
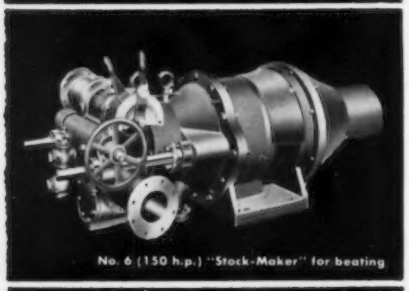
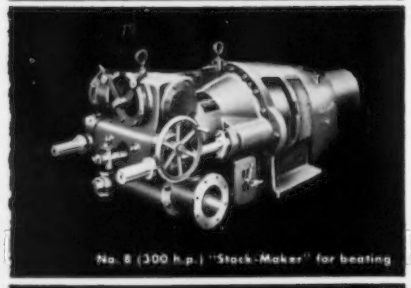


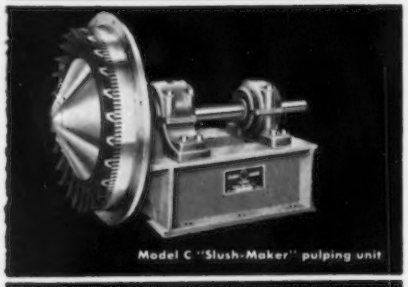
"Stuff-Maker" for jordaning



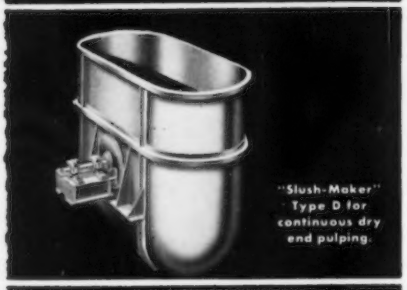
No. 6 (150 h.p.) "Stock-Maker" for beating



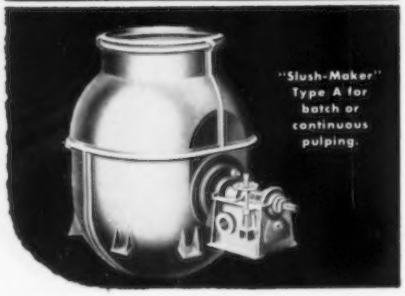
No. 8 (300 h.p.) "Stock-Maker" for beating



Model C "Slush-Maker" pulping unit



"Slush-Maker" Type D for continuous dry end pulping.



"Slush-Maker" Type A for batch or continuous pulping.

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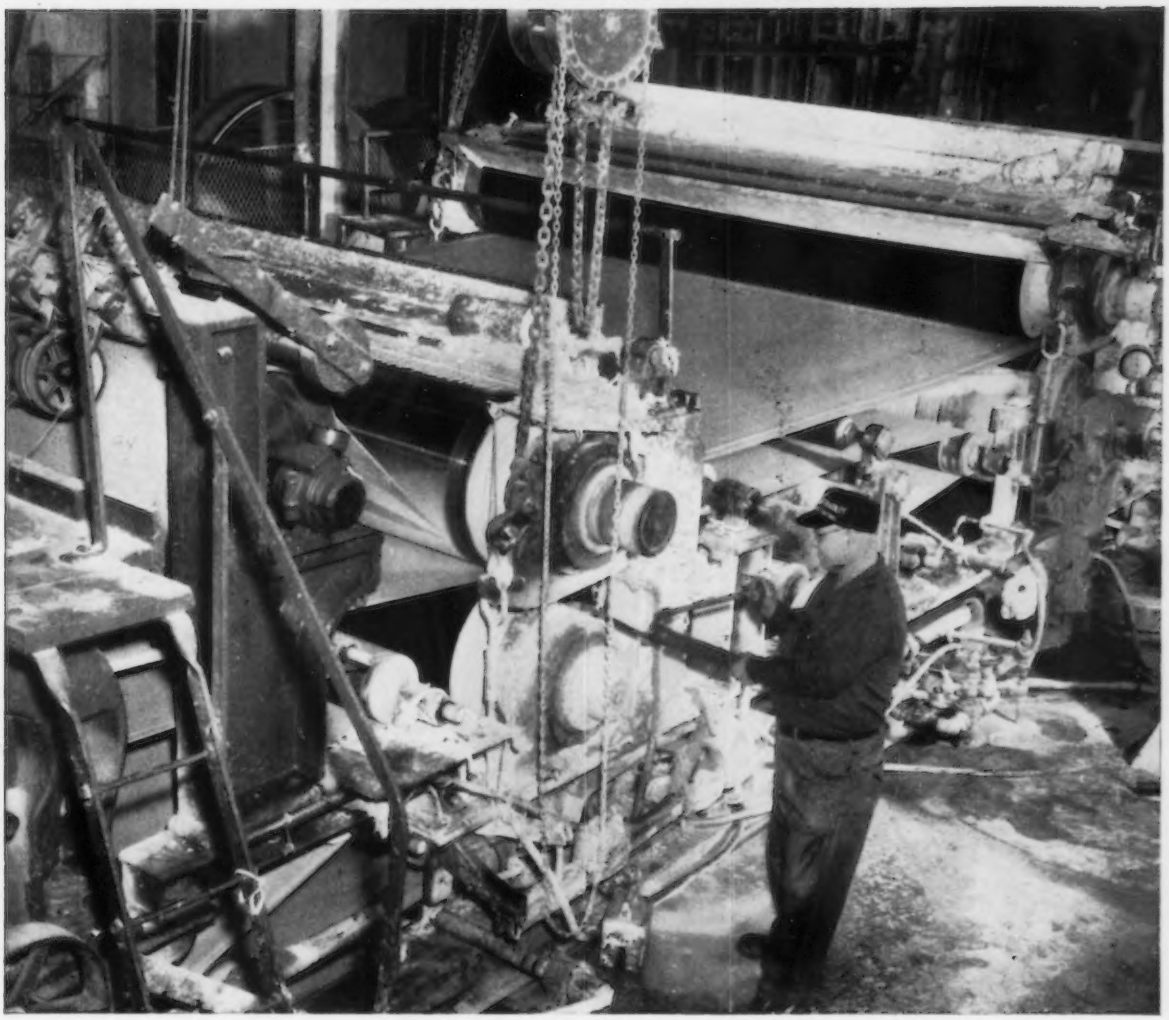

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SEVEN years ago, the paper mill pictured above changed from the bonehard type of top press roll to something entirely different. It was a B.F. Goodrich roll they tried, made with a special *soft* rubber cover. They soon found that this resilient rubber roll gave them better water removal at high speeds, and much longer felt life.

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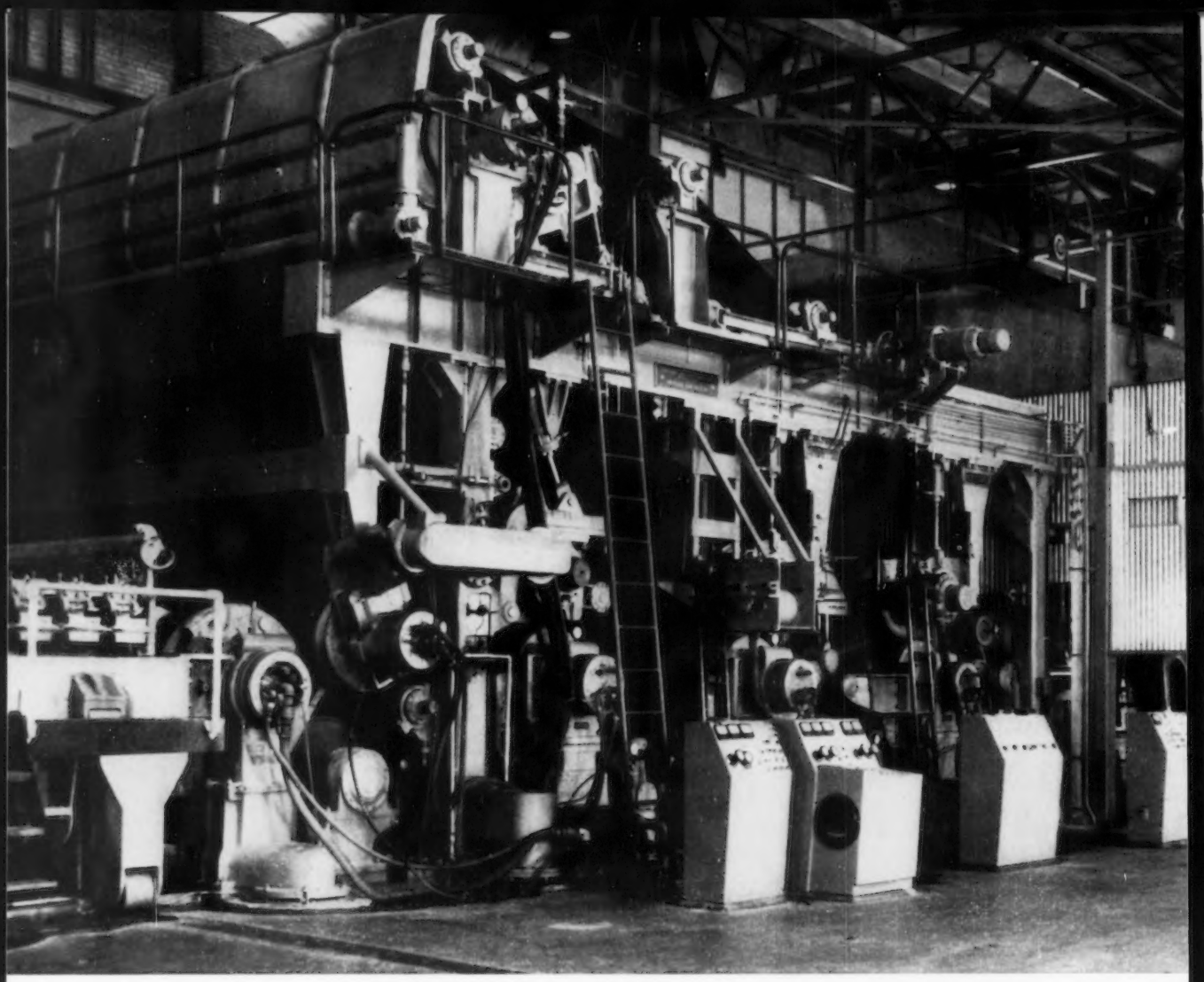

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REMEMBER THESE DATES

May 14-16: TAPPI Coating Conference, Bedford Springs Hotel, Bedford Springs, Pa.

May 20, 21: National Paperboard Assn. Spring Meeting; Santa Barbara Biltmore Hotel, Santa Barbara, Calif.

June 2-4: Technical Section, CPPA, Summer Meeting, Chateau Frontenac, Quebec City.

June 3-5: Superintendents' Assn. Annual Meeting Statler Hotel, Boston, Mass.

July 28-Aug. 1: TAPPI Engineering Conference, Multnomah Hotel, Portland, Ore.

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PAPER TRADE JOURNAL

Published Weekly Since 1872

April 14, 1958, *Vol. 142, No. 15*

TRENDS 13

NEWS BRIEFS

Butler Buys Rex Paper Mill 17
Fibreboard Expanding Antioch Mill 17
Eastern and Standard Discuss Merger .. 17
New Paper Machine for Woodbridge . 17
West Virginia May Buy Bag Plants . 17
Diamond-Gardner Bond Offering .. 17

FEATURE ARTICLES

Present Treatment Practice of Kraft Mills on Air-Borne Effluents 28
Your White Water Tanks Design Can be Improved 36
New Device for Soaking Wood before Barking .. 42
Productive Maintenance and Your Electrical System 45
Groundwood Fraction Mixing Process 48

PAPER PEOPLE 20
NEWS OF CONVERTERS 24
FIGURES OF THE WEEK 33
PRICES OF MATERIALS 52
NEWS OF MERCHANTS 54
OBITUARIES 54
NEW EQUIPMENT 56
PRICES OF FIBERS 60
CLASSIFIED ADVERTISING 66
ADVERTISERS INDEX .. 70

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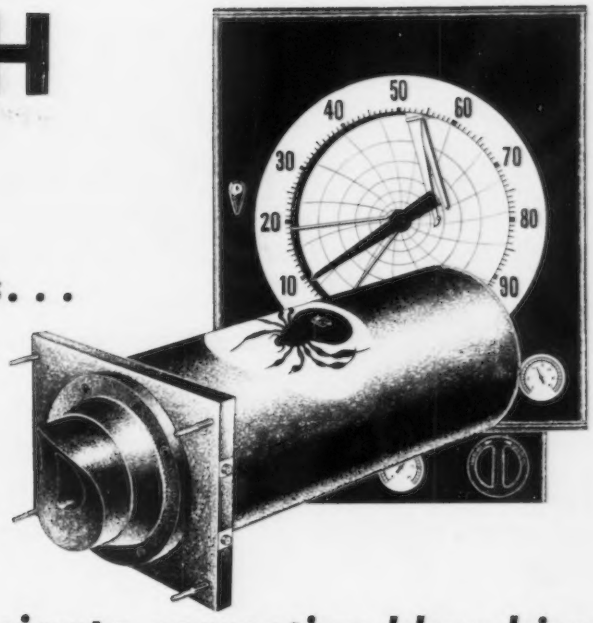
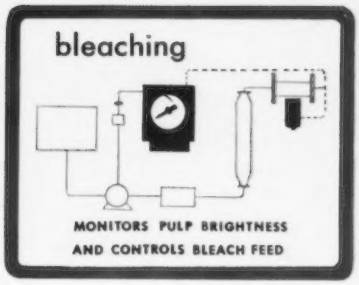
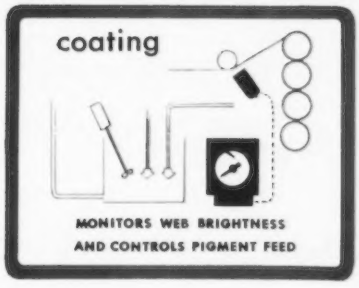
SMOOTH OUT

your bleaching process. . .





. . .eliminate corrective bleaching after the first stage.



When pulp bleach demand varies, a lot of pulp can be under or over bleached. Corrective action must then be taken in the next bleaching stage, (as much as possible, that is). Consider how smooth the whole process would be if, during the first stage, you could change bleach feed in precise proportion to any changes in bleach demand—as they occur!

That is what the Black Widow does for bleaching processes. This "smoothing-out" not only cuts pulp mill overhead, but results in better end-product uniformity, as well. And the Black Widow is probably the least expensive piece of automation equipment for the pulp and paper industry. Write today for literature on the guaranteed, mill-proven Black Widow. Ask for your copy of the report "Continuous Brightness Measurement and Control with the Black Widow Photometric Instrument" by D. Noel Obenshain.

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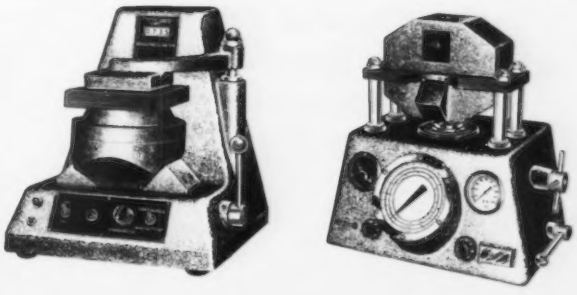
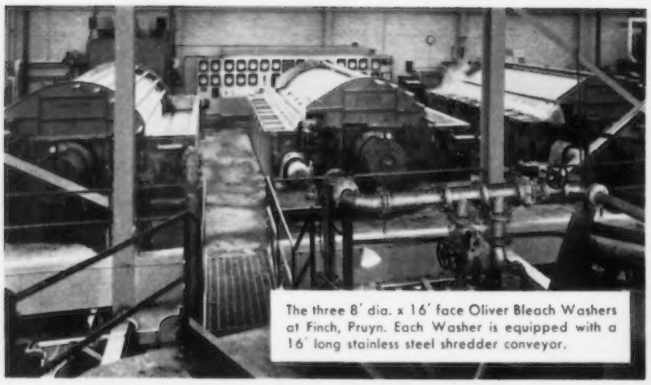
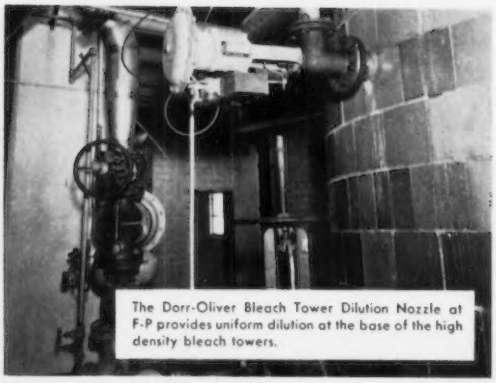
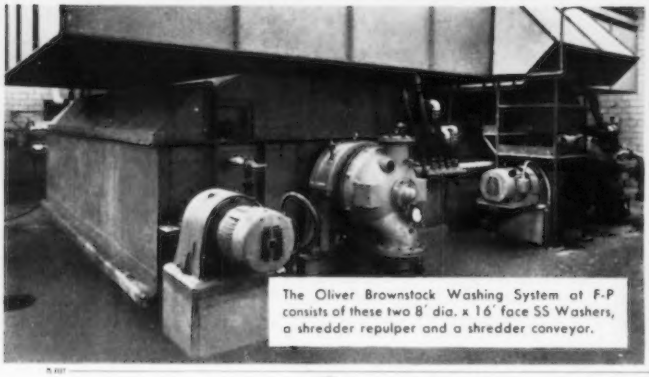




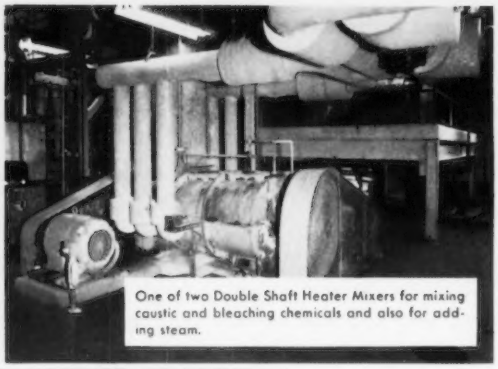
The three 8′ dia. x 16′ face Oliver Bleach Washers at Finch, Pruyn. Each Washer is equipped with a 16′ long stainless steel shredder conveyor.



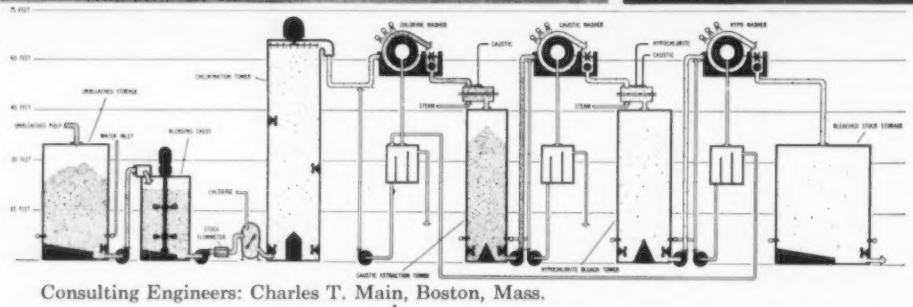
The Dorr-Oliver Bleach Tower Dilution Nozzle at F-P provides uniform dilution at the base of the high density bleach towers.



The Oliver Brownstock Washing System at F-P consists of these two 8′ dia. x 16′ face SS Washers, a shredder repulper and a shredder conveyor.



One of two Double Shaft Heater Mixers for mixing caustic and bleaching chemicals and also for adding steam.



Flowsheet of Dorr-Oliver Continuous Pulp Bleaching System similar to that employed at Finch, Pruyn and Company.

Consulting Engineers: Charles T. Main, Boston, Mass.

New Hardwood Mill at Finch, Pruyn Equipped with

Dorr-Oliver Continuous Pulp Bleaching System & Oliver Brownstock Washing System

When Finch, Pruyn and Company's new neutral sulphite mill was dedicated late in 1957, it also marked the operation of the first complete Dorr-Oliver Continuous Pulp Bleaching System. Located in Glens Falls, New York, the new multimillion dollar Finch, Pruyn mill is manufacturing hardwood pulp for production of high strength, high brightness, and economically priced printing and converting papers. Present production of the semi-chemical pulp mill ranges between 70 and 100 TPD and is geared for an eventual capacity of 140-150 TPD.

Based on certain equipment designs by the James Brinkley Company of Seattle, Washington, the new D-O Bleach System supplements the existing Oliver Brownstock Washing System, the Dorr Recausticizing System, and the complete line of D-O industrial water and waste treatment equipment which have been commercially available to the pulp and paper industry for many years.

Additional facts, figures and photographs of the bleach equipment may be obtained by writing Dorr-Oliver Incorporated for a copy of Bulletin No. 3305, The Dorr-Oliver Continuous Pulp Bleaching System . . . just released.

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ANNIN VALVES

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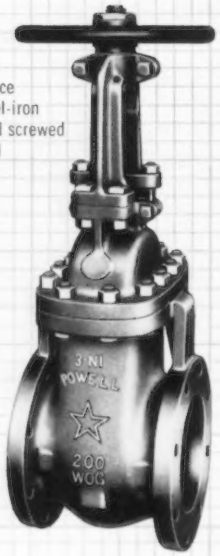
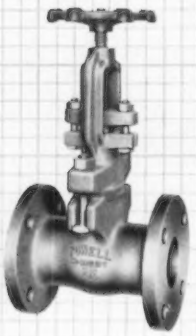
world's largest family of valves

Fig. 1893 - Alloy Cast Iron Paper Mill Service Valve for 200 pounds W.O.G. Has 3% Nickel-iron body, bonnet and yoke; 18-8S Mo stem and screwed seat rings; Ni-resist accurately guided solid wedge disc. Sizes 2" to 30", inclusive.





Figs. 2195 - 2196 - Flanged end Ni-resist O.S. & Y. Gate Valve for 200 pounds W.O.G. Sizes 1" to 3", inclusive. Fig. 2195 has regular face to face; Fig. 2196 has short face to face.

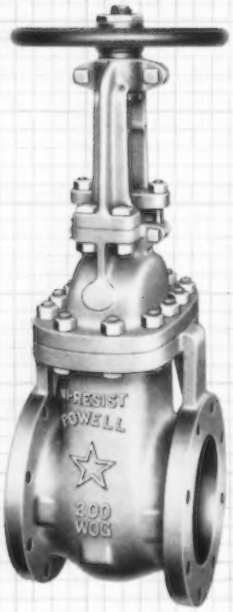


Fig. 2193 - Ni-resist O.S. & Y. Gate Valve for 200 pounds W.O.G. Bolted flanged bonnet, flanged ends. Two-piece yoke, 5" to 12". Valve with one-piece yoke also available in 4" size.

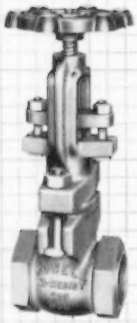


Fig. 2194 - Small Screwed end Ni-resist Gate Valve for 225 pounds W.O.G. Bolted bonnet, outside screw rising stem and yoke. Size 4".

Fig. 2192 - Flanged End Ni-Resist Swing Check Valve for 200 pounds W.O.G. Bolted flanged cap. Sizes 2" to 12", inclusive.

Powell offers more kinds or types of valves, available in the largest variety of metals and alloys, to handle every flow control requirement. Included in the Line are those shown—valves especially made for Pulp and Paper Mill Service. Consult your local Powell Valve distributor—if none is near you, write

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CHIPS BURN...

BUT PAPER REMAINS STRONG AND CLEAN . . . THANKS TO CENTRI-CLEANERS

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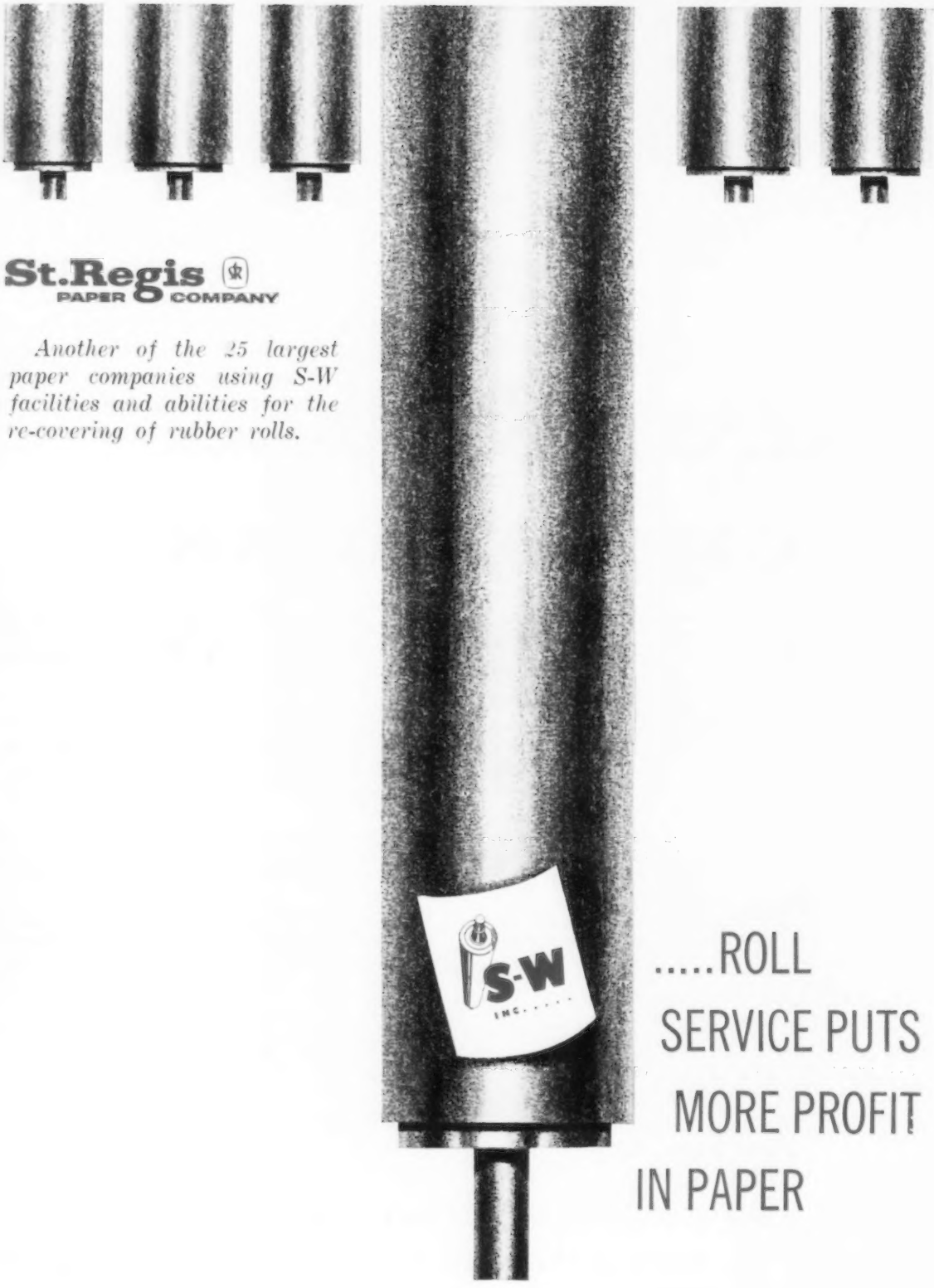
At the Centri-Cleaners, things looked much brighter. All of the bits of charred wood were being removed and the pulp was left clean. Not a pound of pulp was lost, and the resulting paper was the usual clean, high quality product.

This incident occurred in the sulphite mill of a large eastern paper company. It parallels many other stories attesting to the effectiveness of Bauer Centri-Cleaners. Do you have a cleanliness problem? Wire, write or call FAirfax 3-5501.

THE BAUER BROS. CO.

1758 SHERIDAN AVE., SPRINGFIELD, OHIO



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On the West Coast: HUNTINGTON RUBBER MILLS, INC., Seattle 88, Washington

Merger Trend Continues

Two items on the News of the Week page in this issue show that the trend of mergers and acquisitions in recent years is still active. These stories refer to a Standard Packaging-Eastern Corp. merger and the acquisition by West Virginia of the Arkell & Smiths multiwall bag division.

Rayon-Nylon Tire Battle

Of particular interest to rayon grade wood pulp producers is the current battle for the tire market between nylon and rayon. At the present time rayon dominates the market with 99% of the cord used in tires supplied with new automobiles. Nylon producers are actively fighting for a large share of this market. It is claimed on one side that nylon is safer than rayon while on the other side is the fact that nylon tires are more expensive and are reputed to whine and thump. An interesting sidelight of the battle is that the two principal nylon manufacturers are directly or indirectly connected with large volumes of rayon production.

West Coast Liner Prices Off

Two manufacturers of containerboard (liner and corrugating medium) have reduced prices for these grades on the West Coast. Cuts have been as much as 10 per cent. Informed sources do not think that this questionable action will spread over the Rockies.

What's the Meaning of Unemployment Figures?

The significance of employment figures as a measure of business activity is susceptible to many interpretations. Consider the following statements—Employment in mid-March rose to 62.3 million, *only* 2.5% below the record-breaking March of last year—Unemployment is up 80% over a year ago—While total employed are off only 1.6 million for March, unemployed are up 2.3 million—7.7% of the civilian labor forces are unemployed as compared with 4.4% in the boom record March of last year—If 4% unemployed is acceptable for a boom period then 4% more doesn't indicate a very serious recession. The apparent contradictions in the above statements, all of which are true, is due chiefly to the increase in the number of people who are seeking work; new employables (youths) and members of families (chiefly women), not previously employed who are looking for jobs. Once these people list themselves as looking for a job they are automatically listed as unemployed according to government statistics. The other factor in our confusing statements is our effort deliberately to present the situation from different views.

Kraft Mill Odor Problems

Kraft mill odors are an important public relations problem. Very worthwhile efforts to abate these odors are being carried out by the mills and by the National Council for Stream Improvement (need for a new name seems indicated). This issue carries a detailed report of the mills' activities in this direction by a National Council staff member.

PROGRESS

*SCAPA Synthetic-Content Dryer Felts

are WAY OUT IN FRONT!

(Reports from leading American Paper Mills)

NEWSPRINT:
"Scapa Synthetic-Reinforced Cotton Dryer Felt, Type 1164-S, ran 107 DAYS, allowed increased machine speed and lower steam consumption, against average felt run of 60 DAYS on Cotton or Asbestos Felts."

WRAPPER:
"Scapa Synthetic-Reinforced Cotton Dryer Felt, Type 1164-S, ran 102 DAYS against average run of 55 DAYS on Cotton Felts."

OFFSET PAPERS:
"Scapa Synthetic-Reinforced Cotton Dryer Felt, Type 1164-S, ran 200 DAYS, against average run of 50-60 DAYS on Cotton Felts."

GLASSINE AND LIGHT WEIGHTS:
"Scapa Synthetic-Reinforced Cotton Dryer Felt, Type 1164-S, established a record of 155 DAYS run, as against an average of 80 DAYS on Cotton Felts."

KRAFT AND BOARD:
"Scapa Synthetic-Reinforced Cotton Dryer Felt, Type 1166-S, with Green Dacron Edges (U.S. Patent No. 2,612,190) ran 212 DAYS, against an average of 180 DAYS - using Asbestos Felts."

NEWSPRINT:
"Scapa Syntho-Asbestos Dryer Felt, Type 3480-C, still running perfectly after 122 DAYS, as against an average of 45 DAYS on Asbestos Felts.".

BOND:
"Scapa Syntho-Asbestos Dryer Felt, Type 3175-C, ran 140 DAYS with perfect satisfaction, as against average runs of 60 DAYS on Asbestos Felts."

9-POINT BOARD:
"Scapa Syntho-Asbestos Dryer Felt, Type 3480-C, gave a record run of 142 DAYS, against average of 90 DAYS on Asbestos Felts."

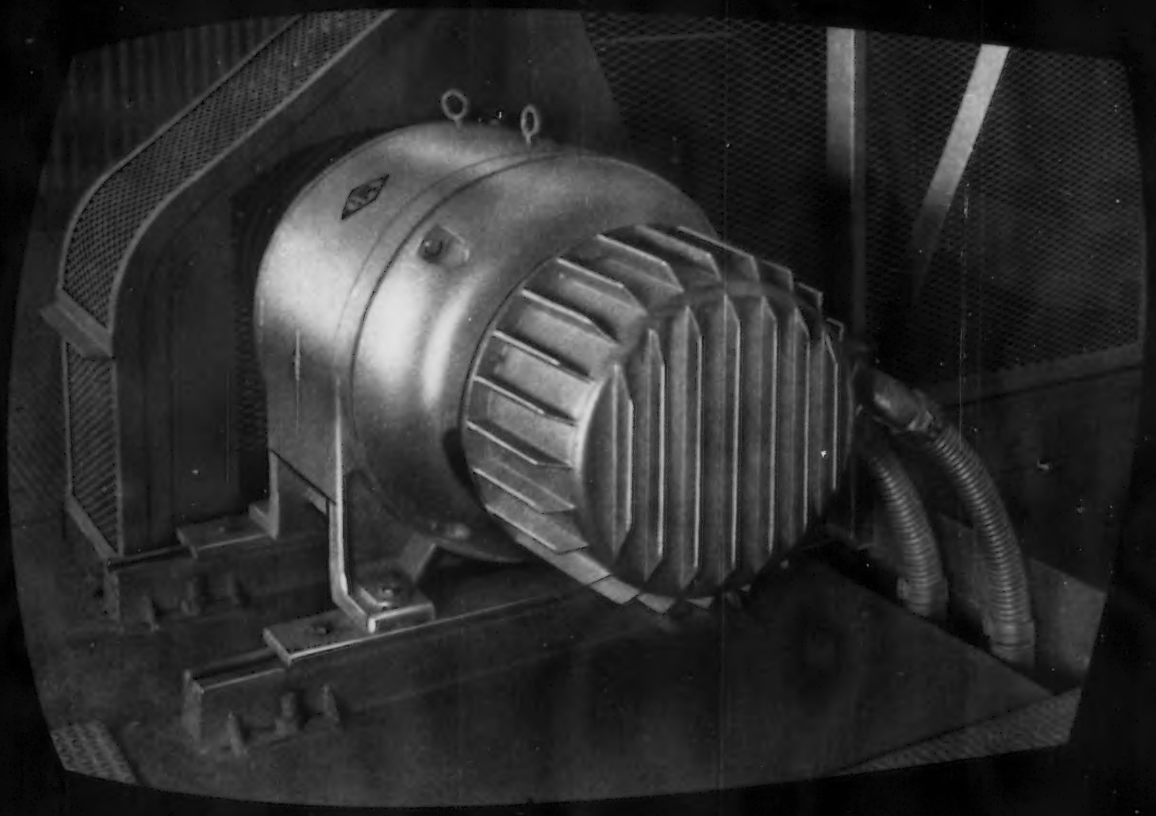
Increasing Efficiency, Cutting Costs
and Stimulating PROGRESS wherever they are used!

Morey Paper Mill Supply Co.
309 South Street, Fitchburg, Mass.

SOLE U.S. AGENTS FOR

SCAPA DRYERS, INC.
WAYCROSS, GA.

*U.S. Patents Pending



long-run power by Allis-Chalmers

Heavy load? Speed variation needed? Wound-rotor motors are the answer

HEAVY inertia loads, limited power supply, intermediate speeds, smooth acceleration . . . if one or all of these factors are involved in your drive application, the answer is the long-run power of Allis-Chalmers wound-rotor motors.

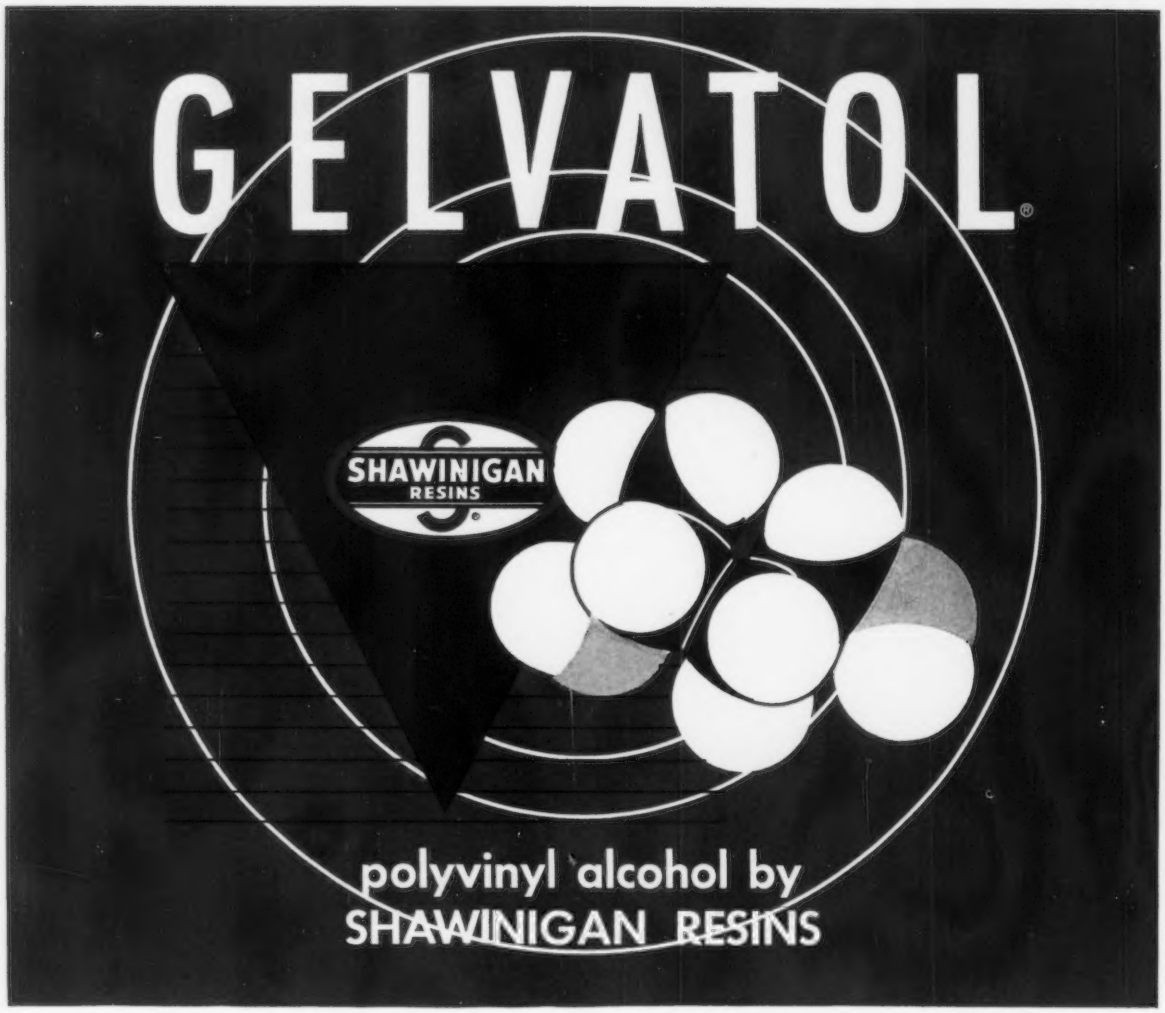
Under the toughest load, these motors come up to controlled speed quickly — saving man-hours and machine-hours. And, fast speed adjustment guarantees a safe, accurate drive.

Other features include: *distortion-free bearing support, easy access to collector rings and brushes, efficient ventilation, and simplified lead connections permitted by large conduit box.*

Allis-Chalmers wound-rotor motors are available in all types of enclosures for both continuous and intermittent duty in NEMA frame sizes 284 and above. Contact your A-C representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5667



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The unique particle structure of GELVATOL polyvinyl alcohol, permits packaging in a smaller, easier-to-handle, 50 lb. bag. And because the bag is smaller, GELVATOL requires 25-50% less storage area, which means you can make substantial savings in your storage costs.

Twelve grades of commercially proved GELVATOL (all of which are above average in quality) are now available to you for more efficient, more profitable formulating. Standard grades for adhesives, textile sizes, paper coatings, and films, as well as the new extremely low-viscosity grades for specialty applications are ready now.

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1. Unique particle structure that cuts your storage requirements.
2. Notable uniformity from bag to bag, lot to lot.
3. Particle size that minimizes dusting.
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SHAWINIGAN RESINS

Chicago Group Buys Rex Mill

The Rex Paper Co., Kalamazoo, Mich., has been purchased by a syndicate headed by Paul Butler, of Butler Co., Chicago, it has been announced by Mrs. Merrill B. Rex King, president.

Mrs. King retains an interest in the company and will remain as president with J. E. Lean continuing as executive vice president and general manager. Rex Paper will remain a Michigan corporation with its general offices and headquarters in Kalamazoo.

Antioch Board Mill Plans Expansion

Major expansion of diversified productive capacity at the Antioch Board Mill of Fibreboard Paper Products Corp. is announced.

Installation of a new off-machine coater will be undertaken at the Antioch plant this spring. The new machine will be capable of applying a wide variety of coatings to paperboard in widths as great as 92 inches and at speeds up to 1,000 feet a minute.

"With this new installation, plastics, waterproof coatings, 'release' coatings to prevent adhesion of a product to the walls of a paperboard package, clay coatings and colors, can be applied to paperboard at high speeds.

Gypsum Plant Resumes Operations

Papermaking operations at the National Gypsum Co. plant, Kalamazoo, Mich., have been resumed. There had been a partial shutdown while the wet end of the plant's fourdrinier was being rebuilt and other major improvements carried out in the plant. Papermaking operations were halted March 22 and resumed April 7.

West Virginia May Purchase Bag Operations

Negotiations for purchase of the multiwall bag division of Arkell & Smith by West Virginia Pulp & Paper Co. was reliably reported to be nearing completion, as we go to press. Since details had not been completed we were unable to get confirmation of this.

Diamond-Gardner Files for Bond Offering

Diamond-Gardner Corp. filed a statement March 25 with the Securities and Exchange Commission covering a proposed offering of $25,000,000 of sinking fund debentures, due in 1983.

Proceeds from the sale of the debentures will be used, in part, to retire a $12,000,000 bank loan incurred principally for completion of a new integrated forest products plant at Red Bluff, Calif. and expansion of facilities of the Gardner Division. The remaining proceeds will be added to the general funds of the company.

According to Colin Gardner, president of the Gardner Division, the expansion takes in Gardner plants at both Middletown and Lockland. He also said some of the expansion has been under way several months and includes:

One—Expanded power plant facilities at Lockland which includes a 100,000 pound per hour capacity steam boiler, and electrical sub-station, and water treating facilities.

Two—A new liner stock preparation system for the company's paperboard mill in Middletown.

Three—A four-color Harris offset press in Middletown.

Four—A new type of coater in the Middletown, Ohio board mill. This installation is almost complete and trial runs on the coater are now being made.

Five—A new building adjoining the Gardner retail box plant at Lockland to house the company's rotogravure printing operation.

I. P. Bag Plant for L. A.

A new plant for the manufacture of grocery bags and grocery sacks will be built by International Paper Co. in Los Angeles, Calif.

For many years, International Paper has produced grocery bags and sacks, specialty and variety bags for its West Coast customers at its Mobile, Ala. bag plant.

The new plant is scheduled to be in operation by the summer of 1958.

Eastern and Standard Courting

Presidents of Eastern Corp. and Standard Packaging Corp. have admitted this week that merger discussions are going on between the two companies.

New Paper Machine at Woodbridge Mills

The installation of a second paper making machine is planned to begin in June at the Woodbridge Paper Mills Inc. in South Hadley Center, Mass.

The machine would enable the plant to go into the production of facial and toilet tissues in addition to wrapping tissue already manufactured at the plant.

The mill was formerly the Pearl City Division of the American Tissue Mills which went bankrupt in 1954 and at various times since had been operated as the South Hadley Paper Mills, Inc., and the Guilford Paper Mills. Originally it had two papermaking machines; during one of the recent ownerships one of the machines was dismantled and shipped to South America where it was sold.

Culmination of a complete rebuilding program by the owners was realized April 14 when the plant resumed operations. The plant has been shut down for about five weeks while construction estimated at well over $200,000 has been underway.

The new president of the organization is Dr. Emil M. Ferris, a physician. Treasurer of the firm is Samuel Salem who is also president-treasurer of Sam Salem Inc., a furniture concern.

Clerk of the corporation is George A. Saba, a shipper. Other owners and members of the board of directors are Basil M. Ferris, brother of the firm's president; and John J. Ziter, treasurer of Ryan Court Garage, Inc. and Ryan Court Service Station, Springfield.

The five men are also officers and directors in Ansco Realty, Inc. of Springfield.

At the present time the plant will manufacture machine glazed tissue.

All new motors have been installed on all the equipment, converting the machines from belt-driven to direct drive.

Scholarship Available

A scholarship in the amount of $500 for each of the first two years at the University of Maine has been made available by *Paper Trade Journal*.

The purpose of the scholarship is to make it possible for a high school graduate to enter the University who otherwise might not be financially able to do so.

The scholarship is available to qualified students anywhere who are interested in taking the pulp and paper course at the University of Maine. Application should be made to Percy F. Crane, Director of Admissions, University of Maine, Orono, Maine. As stated above, extra consideration will be given to financial need.

Canadian Wood Pulp February Figures

February wood pulp production in Canada declined from 834,021 tons a year ago to 752,096 tons this year. Bleached kraft pulp output for the month though, increased from 69,093 tons in February a year ago to 75,343 tons this year. Production of pulp for the first two months totalled 1,504,354 tons as against 1,716,630 tons a year ago.

Pulp used in Canada during the month totalled 595,634 tons as compared with 638,156 tons a year ago. Canadian consumption for the year to date was 1,209,739 tons as against 1,323,675 tons a year ago.

Exports of every grade of pulp also declined in February when 151,916 tons were exported as compared with 185,589 tons in 1957. For the year to date, exports dropped from 364,722 tons a year ago to 280,997 tons this year.

Two Supts. Assn. Groups Plan Meetings

The Pennsylvania-New Jersey-Delaware Division of the Superintendents Assn. will hold its 1958 Spring meeting May 9-10 at the Yorktowne Hotel, York, Pa.

The April 22 meeting of the Miami Valley Division of the Superintendents Assn. will be held at the Manchester Hotel, Middletown, Ohio.

Testing Conference Scheduled for Fall

The Ninth TAPPI Testing Conference will be held at the General Oglethorpe Hotel, Savannah, Ga., September 30 to October 2.

"Paperboard Testing" is the theme of this year's conference, which will feature four half-day technical sessions as well as working meetings of most of the committees of the sponsoring Testing Division.

An innovation at the Savannah meeting will be the sponsorship by the TAPPI Graphic Arts Committee of a session on Testing for the Graphic Arts. In addition to the theme session and Paperboard Testing, there will also be a general session on Testing and a session on Precision.

G-P's Dramatic Move— Pays in Silver Dollars

Lincoln County, Oregon, experienced a new type "Dollar Day" recently when Georgia-Pacific Paper Co. at Toledo, Ore., paid employees in silver dollars in place of the regular pay checks received each two weeks.

This unusual method of payment intended to show the communities the influence of a new payroll and new people located in Lincoln County as a result of the new kraft mill operation.

A secondary aim was to illustrate the channels in which money flows locally.

The results of this experiment were interesting in many phases. Although the pay period was somewhat shorter than normal and fewer dollars were distributed, nearly twenty-five thousand silver dollars were packed out of the mill by good natured employees.

Paper and Board Production

According to the American Paper and Pulp Assn., the ratio of the United States production to mill capacity for the week ending March 29, 1958, was 90.5 per cent compared with 91.0 per cent revised for the preceding week. The ratio was 97.2 per cent for the corresponding week a year ago.

The paperboard production ratio for the week ending March 29, 1958, was 86 per cent compared with 88 per cent for the preceding week and 92 per cent for the corresponding week last year.

(Detailed statistics on page 33.)

Gottesman Gives $10,000 for WMU Paper Building

A gift of $10,000 has been given to Western Michigan University for its Paper Industry Laboratories building and equipment fund by the D. S. and R. H. Gottesman Foundation, it is announced by Dr. Paul V. Sangren, WMU President, and Ira D. Wallach, president of the Foundation.

This gift honors the memory of the late D. Samuel Gottesman and will be used to supply and equip a laboratory or classroom in the $225,000 structure.

Technical Section Summer Meeting at Quebec

Quebec City, P.Q., and the Chateau Frontenac will be the scene of the 1958 Summer Meeting of the Technical Section, Canadian Pulp and Paper Assn. Sessions will begin Monday morning, June 2, and will end Wednesday afternoon, June 4. Advanced registration will take place during the evening of June 1, 1958.

The program is not finalized, but the following is a list of tentative topics for presentation either as papers or as group discussions:

Fire Control in Paper Mills.

Practical Application of Noise Abating Devices to Newsprint Machines.

Fundamentals of Drying Paper.

Fine Papers Machine Pressing Problems.

Fire Risks in Machine Rooms and How They Should be Overcome and Prevented.

Paper Machine Winders.

Bird Centri-Screens on Newsprint Furnish at Iroquois Falls.

Increased Yields from Alkaline Pulping of Softwoods.

Anodic Protection of Alkaline Digesters.

Use of Vorjects for Cleaning Groundwood at Sheet Harbour.

Use of Vorjects for Cleaning Groundwood at Port Alfred.

Flash Drying of Groundwood.

Effect of Grit Size and Shape or Groundwood Quality and Production.

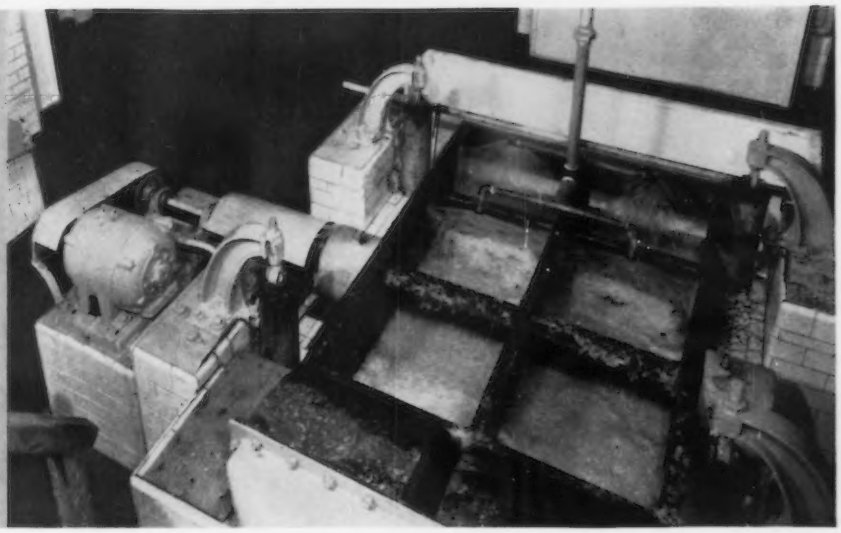
Factors Affecting the Life of Circulating Pump Shafts and Packing.

Bleaching of Sulphite Pulp.

Reports of Lignin Research.

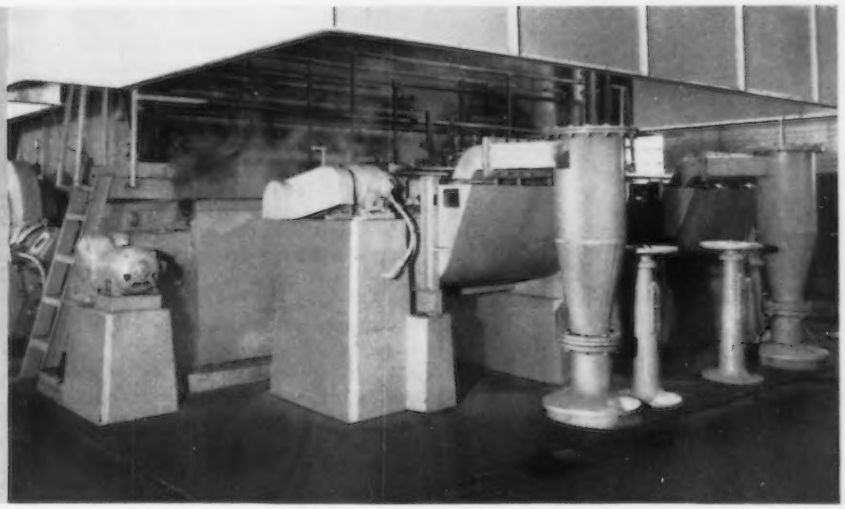
The **stamina** of the old...

This Bird Jonsson Screen has knotted nearly half a million tons of sulphate and is still going strong after steady operation for over fifteen years.



The **efficiency** of the new...

This neat installation delivers 250 tons of knot-free brown stock to a modern kraft washing system.



Wherever there's a job of knotting, bull screening or any kind of perforate plate screening to be done, Bird Jonsson Screens rate first consideration on the basis of their performance in scores of mills.

Capacity per screen runs 80 to 100 tons per day on sulphite, up to 200 tons on groundwood and kraft. Consistencies may be as high as 1½% on sulphite, 2½% on groundwood and kraft. Power cost is only about 0.06 HP per ton.

Write for recommendations, layouts and estimates.

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BIRD JONSSON SCREENS

PAPER PEOPLE

George J. Pecaro

George McKenzie

Fill Top Posts at Flintkote

The election of George J. Pecaro as president of Flintkote Co. to succeed Perce C. Rowe who has resigned "in order to devote his major time to other interests" was announced today by I. J. Harvey Jr., chairman of the board and chief executive officer. George K. McKenzie has been elected executive vice president to succeed Mr. Pecaro who held that post since April last year.

Mr. Pecaro entered the pulp and paper business after his graduation from Iowa State College in 1930 where he majored in forestry. He joined Flintkote in 1939, directing the construction of and becoming manager of the insulation board plant at Meridian, Miss.

He was named general manufacturing manager for the company in 1946 and in 1947 he became general manager of the pioneer (West Coast) Division. He was elected a vice president in 1948, a director in 1952 and general vice president in 1956.

Mr. McKenzie, formerly vice president and secretary of the company, joined Flintkote in 1928. He became insurance manager and served as assistant secretary from 1936 to 1938 when he was named secretary. In 1945 he was elected a vice president and in 1956 a director. He will continue as secretary of the company.

Union Bag-Camp Promotes in Technical Div.

W. C. Chapman assistant plant technical director at Union Bag-Camp Corp.'s Savannah plant, is being promoted to plant technical director at the company's Franklin, Va., paper mill effective around May 1.

R. R. Chase, formerly superintendent of mill technical, has been moved up to replace Mr. Chapman in Savannah.

H. T. Robson, assistant superintendent in mill technical, has been made superintendent of that department.

R. E. Millar will replace Mr. Robson as assistant superintendent of mill technical, in charge of the process engineering section.

J. J. Owen will replace J. C. Bowers as superintendent, chemical products development department, Savannah.

M. J. Troster will replace Mr. Millar as group leader of the Technical Division's paper mill group. Mr. Bowers will replace T. S. Burns as assistant superintendent of chemical products operations, and will be in charge of the tall oil plant reporting to W. O. Ralls Jr.

Mr. Burns will replace Mr. Owen as group leader of the general group in mill technical.

R. W. Bolling will assume the position of assistant superintendent, factory technical, in charge of the development.

Chemist Named at M&O

Ramon R. McNeil was appointed research chemist at the Minnesota and Ontario Paper Co. laboratory in International Falls, Minn. He was formerly with Munsing Paper Co., a subsidiary of Kimberly-Clark, and Wood Conversion Co., at Cloquet, Minn.

Heads Merrimac Lab

Lyman Billings has been appointed laboratory director at Merrimac Paper Co. Inc.

Dunn Officers in New Positions

At the annual stockholders' meeting of Dunn Paper Co., Theodore W. Dunn was elected chairman of the board. He has been president since 1924. He will continue in the office of treasurer, which position he has held since 1948.

George C. Dunn, who held the office of executive vice president and secretary, was made president and secretary. George Dunn has been connected with his father in the company, holding various offices since its inception.

Riegel Fills N.J. Posts

L. H. Bidwell Jr., superintendent of Riegel Paper Corp.'s Hughesville mill, will assume new duties as assistant to W. A. Schenck, Upper Mills manager, New Jersey Division.

D. H. Newcomb, who has been serving as acting superintendent, will become superintendent of the Hughesville, N. J. mill.

Consolidated Adds to Technical Dept.

Warren A. Wickstrom has joined the technical department of Consolidated Water Power & Paper Co. Mr. Wickstrom was graduated from Michigan State University in 1957 with a Bachelor of Science degree in chemical engineering. He has been assigned to the company's new Wisconsin Rapids Division Semichemical Recovery Plant, which is now in the final phase of construction, as a process engineer.

Personnel Changes at Rayonier

Rayonier has announced several shifts and promotions of key personnel in its southeast operations.

George E. Scofield has been appointed resident manager of the company's Jessup (Georgia) Division, and Blanton W. Haskell promoted to resident manager of the Fernandina Division at Fernandina Beach, Fla.

Fred B. Doherty, general manager of Rayonier's Southeast manufacturing, temporarily filling the vacant post of resident manager at the Jessup Division, is to resume his regular duties.

Mr. Erickson also announced that John L. Aitkens, currently assistant chief engineer of the newly formed Southeast Central Engineering Division at Jessup, becomes acting chief engineer during an interim period.

Mr. Scofield joined Rayonier in 1957 at its Grays Harbor Division at Hoquiam, Wash., and Mr. Haskell became associated with Rayonier in 1946.

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Leading paper manufacturers report Dryden pulp unequaled in brightness, cleanliness, strength and ease of beating. And it is kept uniform by rigid quality control standards.

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20 North Wacker Drive, Chicago 6, Ill.

Chesapeake Corp. Elects Olsson

Directors of the Chesapeake Corp. of Virginia elected Carl A. Olsson, general woodlands manager, an officer of the corporation at a meeting in West Point, Va. Mr. Olsson's new title is vice president and general woodlands manager. The stockholders re-elected all directors, and the directors re-elected all other officers of the corporation.

Riegel Paper Announces Sales Management Changes

Riegel Paper Corp. has announced the promotion of A. J. Ericsson to the newly created position of product manager, merchant and industrial sales. Mr. Ericsson was formerly manager of industrial sales, which position will now be filled by B. M. Foose Jr., who was a product engineer. Mr. Ericsson, who joined Riegel in 1935, will be responsible for developments of new markets, grade structure, product mix, and pricing. Mr. Foose joined Riegel in 1947, and will now be responsible for distribution of Riegel industrial papers and boards.

Both Messrs. Ericsson and Foose will report to Winthrop Endicott, manager of merchant and industrial sales, as will O. E. Lohrke, Jr., who continues as manager of merchant sales.

Arthur P. Christ Jr.

Dierks Appoints Sales Representative

Dierks Paper Co., Hot Springs, Ark., has appointed Arthur P. Christ Jr. sales representative. Mr. Christ's previous experience in paper sales, production and development was with the converting plants at West Monroe, La., now part of the Forest Products Division of Olin Mathieson Chemical Corp., and earlier with the Camp Manufacturing Co. and Union Bag and Paper Corp.

E. Guidroz

I. P. Engineer Publishes Book

E. Guidroz, chief engineer of International Paper Co.'s Pine Bluff, Ark. mill has just had a book on philosophy published, titled *The Thread*.

According to Vantage Press of New York, the book's publisher, *The Thread* is a "comprehensive dissertation on the development of man, tracing his expulsion from the Garden of Eden to the present age of destruction and despair, written with literary merit and moral force."

The story begins with the genesis of creation and, mentions literally every major accomplishment, and mistake, of Mankind up to the present day.

Mr. Guidroz has built his manuscript around the Ego and the Spiritual Man, and in portraying Man's wavering struggle from the "abyss of human depravity" to the "pinnacle of uplifting perfection," challanges mankind to "place itself before the mirror if its conscience".

"I've tried to show that the events of yesterday combine and blend themselves to form the pattern that directs our life for today; that everything is part of the Master Plan, and that every catastrophe which has befallen Mankind has been because of some deviation from that plan."

Senior Wins WMU Study Grant

William Foster, a senior in paper technology at Western Michigan University, will take his books to the Institute of Paper Chemistry, Appleton, Wis., next fall. He is the recipient of a $2,000 graduate scholarship which will enable him to study further in paper technology. While at Western he has studied with the help of a Norman Bardeen Memorial scholarship from the Lee Paper Co.

Ashley Retires

S. Guy Ashley has retired as vice president of Old Colony Envelope in Westfield, Mass. He was a salesman and sales manager before becoming vice president. His two sons are also in the paper business, Sidney G. being a partner in the Colonial Paper Co., Boston and Guy L., president of New Falls Paper Co. in Starlake, N. Y.

Bigl Wins Scott's Ober Award

Joseph H. Bigl, Millinocket, has been named the recipient of the Scott Paper Co. Foundation's Ober Award at the University of Maine.

The award, which will be for 1958-60, is named in honor of J. L. Ober, a retired vice president of Scott who is currently serving as president of the University of Maine Pulp and Paper Foundation.

Mr. Bigl will receive a total of $2,000, one-half of this amount next year and one-half the following year.

A junior in the mechanical engineering department, he has been an outstanding student at the university, making an accumulative average of 3.26 (a perfect average would be 4.). He plans to stay at the university for a fifth year, enrolling in the Five-Year Management course in the pulp and paper program.

John A. Mattor

Wins Paper & Twine Award

The Institute of Paper Chemistry announces the annual Paper and Twine Assn. student award of $150 for work in 1957 has been awarded to John A. Mattor.

Mr. Mattor is 26 years old and his home is in Mechanic Falls, Maine. He received his Bachelor of Science Degree in chemistry at Bates College in June 1957, and is in his first year of graduate study at the Institute of Paper Chemistry with an excellent record.

TIMBER SUPPLY IN THE SEABOARD SOUTHEAST

In the six Southeastern States of Virginia, North Carolina, South Carolina, Georgia, Alabama and Florida, upwards of 113,000,000 acres—or 60% of the total land area—are classed as forest lands.

In addition, more than two billion pine trees have been planted in this area in the past ten years. Thus, in addition to the vast acreage of existing fine stands of timber, large areas of formerly denuded and submarginal lands are being brought into the production of timber for our rapidly growing wood-using industries.

The present capacity of existing nurseries being operated by the various states, pulp and paper companies and others—800 million seedlings per year—is being steadily expanded, thus assuring further increased plantings in the years ahead.

Seaboard's Industrial Department, through its forestry division, works continually for the promotion of sound forestry practices, to the end that an abundant and continuing supply of timber may be available for all future needs.

Warren T. White
Assistant Vice President
Seaboard Air Line Railroad Company
Norfolk 10, Virginia

NEWS OF CONVERTERS

Champion Promotes in Sales Division

The sales division of Hamilton's Champion Paper & Fibre Co. has promoted eight members of the department.

Don DuVall was appointed product sales manager for business papers, Harry Baldwin moved up to supervisor of technical service for printing papers and William Ziegler was made sales manager for paperboard and pulp.

George Arthur was named sales supervisor for converting papers, boards and pulp; Kenneth Swing, assistant sales manager for special lot and government papers; Ralph Colegrove, manager of advertising and sales promotion; John Keitt, manager of sales division management and planning, and Ray Burnett, supervisor of sales analysis and statistics.

N-E Research Appointment

Bob Votava has been appointed to the research department of Nekoosa-Edward Paper Co. as a research chemical engineer. He was one of the first Nekoosa-Edwards Foundation scholarship recipients in 1953. His new job will consist of doing work in paper development.

Eppie Named Weyerhaeuser Div. Manager

Vincent F. Eppie has been appointed manager of eastern board sales for Weyerhaeuser Timber Co.'s pulp and paperboard division.

Prior to joining Weyerhaeuser, Mr. Eppie was vice president of Lewis-Brownville Sales Co., New York City. He will be located in the Weyerhaeuser pulp and paperboard sales offices at 230 Park Ave., New York.

Donald H. Seixas has been appointed manager of western board sales.

Beasley Advanced by Fibreboard

W. R. Beasley has been appointed to the newly-created position of director, manufacturing standards, at Fibreboard Paper Products Corp.

He will review production methods in all of operating divisions and be responsible for analyzing the performance of each division.

Mr. Beasley started his career with Fibreboard as a laborer at the company's Antioch, Calif., plant. He received successive promotions in management and had been manager, manufacturing for the Central Packaging Division since 1956.

Hallmark Names Administrative VP

Donald J. Hall has been elected administrative vice president of Hallmark Cards, Kansas City, Mo. The firm has also announced the establishment of two new operating divisions. A finished goods and warehousing division will be headed by Delmar Lofsted and a new creative mechanics division will be headed by Harold D. Rice.

Mr. Hall has been a director of the greeting card company since February 1956. He started with the company in 1946 and has served as assistant to the president for the last three years. In his new capacity he will be responsible for the office of the treasurer, controller's division and purchasing division.

Mr. Lofsted is a veteran of 16 years with Hallmark, and Mr. Rice joined the company as an artist in 1941.

Doepac Industrial Div. Sold to Cellu Products

Doeskin Products Inc. has sold its Doepac Industrial Division to Cellu Products Co., Patterson, N. C. According to Robert E. Partenheimer, general sales manager of Doeskin Products Corp., Doeskin plans to devote its complete efforts to the development and manufacture of resale items.

The Cellu Products Co., which is concerned entirely with the manufacture of cellulose wadding, took over the Doepac converting equipment and the Doepac sales organization April 1. There will be no change in the Doepac established distributor policy and the present sales representatives, M. Nemith of Chicago, G. Beale of Buffalo and W. Gallagher of New York City will continue to service all franchised distributors.

Ohio Boxboard Advances Two

Appointment of Harry L. Hugill as manager of the Ohio Boxboard Co.'s Lockport, N. Y., subsidiary plant, Western Containers, and of Norman Smith to succeed Mr. Hugill as Youngstown, Ohio, plant manager, has been announced.

Robert G. Redman has been named sales manager for the Youngstown sales district.

Imperial Bag to Open Plant in Pine Bluff

Imperial Bag and Paper Co. will open a plant in Pine Bluff, Ark., to use paper produced at Pine Bluff mills.

Robert M. Meyer, president of Imperial, said the plant, which will be located in buildings formerly occupied by Central Transformer Corporation at the Pine Bluff Arsenal, would make single wall kraft paper grocery bags.

Equipment for the plant has not been installed and no date has been set for the start of production, Meyer said.

Dixie Cup Plans Blanket TV Drive

A month-long TV advertising saturation campaign to promote sales of its cup dispensers and refill packages as well as steri-packed cups and plates will be conducted by the Dixie Cup Division of American Can Co. from April 17 through May 16 on the NBC network.

In its advertising, Dixie Cup will offer consumers two dispensers for the price of one.

J. R. Wood, home products sales director, said the saturation campaign will provide the strongest concentrated support in Dixie Cup history for sale of home dispensers, cups and plates.

Rap-in-Wax Names Hannon as Official

Robert F. Hannon Jr., has been named production control manager of Rap-In-Wax Paper Co.

He was formerly production control supervisor with Remington Rand Corp.

Nat'l Blank Book Moves in Dallas

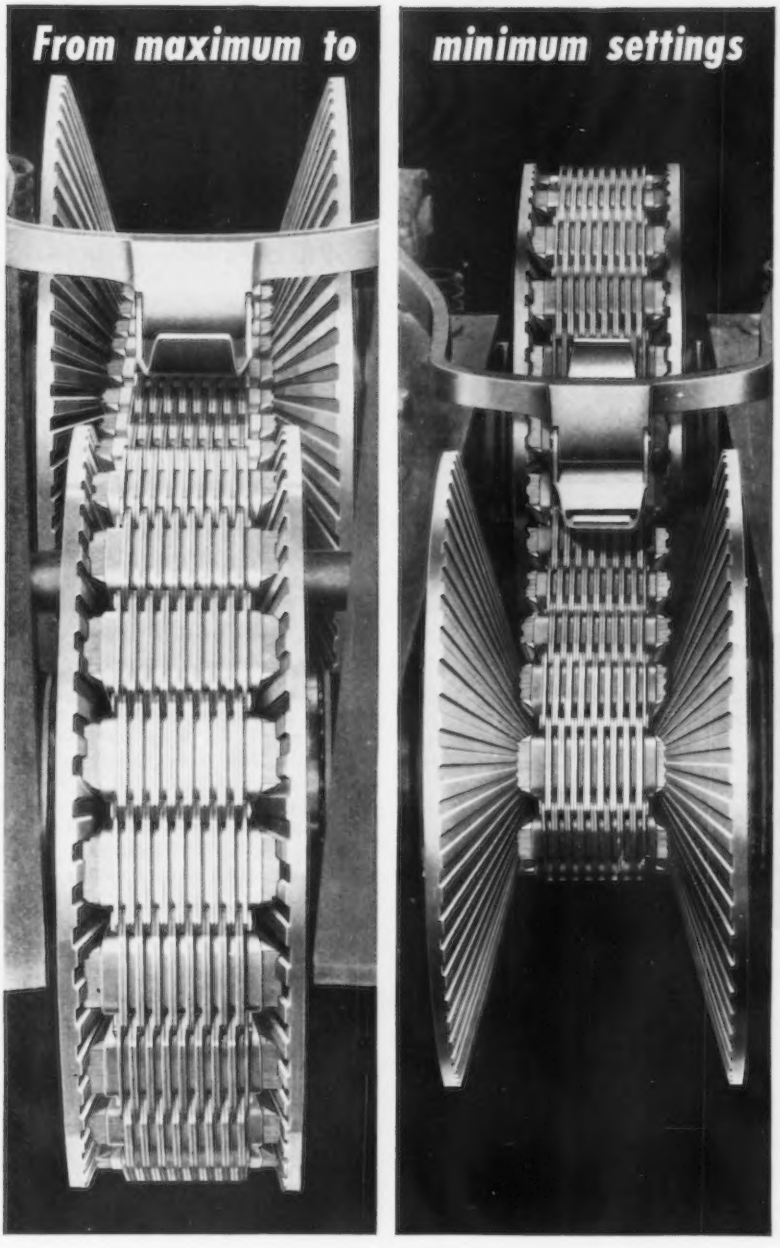
National Blank Book Co., Holyoke, Mass., has moved into new quarters at 122 Howell, Dallas, Texas.

Manufacturers of record keeping forms, loose-leaf notebook, bound books and catalog covers, the company was formerly located at 107 Manufacturing.

The new building, served by truck loading docks, has 10,000 sq. ft. of floor space, twice the area National Blank Book formerly occupied. The company will serve Texas, Oklahoma, Louisiana, Arkansas and New Mexico from the new quarters.

For positive, accurate speed control

...there's nothing like P.I.V.



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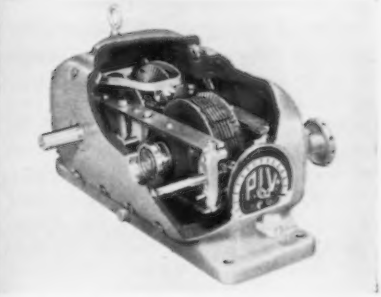
Your Link-Belt office or authorized stock-carrying distributor has Book 2274 on P.I.V. drives from ½ to 25 hp. Refer to the yellow pages of your local phone directory under Power Transmission Equipment.



HOW P.I.V. WORKS. Exclusive self-tooth-forming chain of P.I.V. consists of packs of free-sliding steel slats which serve as teeth. Chain grips beveled grooves on pairs of conical wheels located on input and output shafts. Speeds are changed by varying the effective diameters of the wheels, as shown at left.

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LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.513

Hilton Heads H & D West Canada Operations

Hinde and Dauch Paper Co. of Canada Ltd. has appointed W. Roy Hilton vice president, western Canada operations. Since 1954 he has been senior executive officer of Hilton Bros. Ltd., a subsidiary of Hinde and Dauch, manufacturers of corrugated shipping containers which has recently been fully integrated with the parent company.

Mr. Hilton will continue to make his headquarters in Winnipeg. Western operations comprise sales offices at Winnipeg, Saskatoon, Calgary and Edmonton; sales agents in Vancouver and manufacturing plants at Winnipeg and Calgary. He is the third generation of his family to be associated with the Canadian corrugated shipping case industry.

Fibreboard Corp. Creates New Packaging Div.

Fibreboard Paper Products Corp. has created a new operating division to coordinate its three West Coast packaging divisions.

Jack H. Grady has been appointed general manager of the new division, the Packaging Group. Prior to his present appointment, he was general manager, Central Packaging Division.

H. H. Robbins, formerly sales manager with Fibreboard Products (Eastern Division) Inc., has been appointed general manager, Central Packaging, succeeding Grady. L. W. Reed has been appointed manufacturing manager, Central Packaging reporting to Mr. Robbins.

W. R. Normington, formerly director of manufacturing services for Fibreboard, will assist Mr. Grady as general production manager, Packaging Group.

Piggott Named Manager of Container Corp. Plant

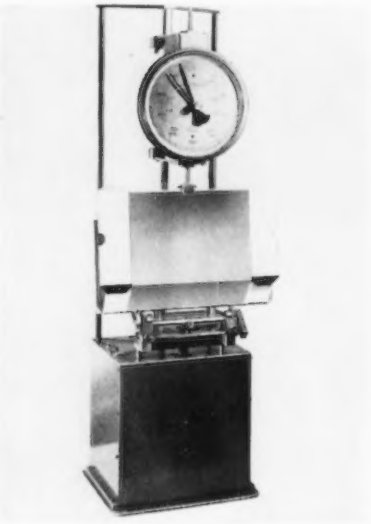
Robert C. Piggott has been appointed general manager of Container Corp. of America's corrugated shipping container plant in Cleveland.

He joined Container Corp. at the company's Rock Island, Ill., corrugated container plant as a sales trainee in 1948. In September, 1956, Piggott was appointed assistant sales manager at the company's Cincinnati, Ohio, corrugated container plant and in 1957 he was transferred to the Cleveland plant with similar responsibilities. He was appointed sales manager at the Cleveland plant December 31, 1957.

Ohio Boxboard Develops Score Bend Tester

As filling line speeds have increased, the forces necessary to "open up" a folding carton and fold flaps in the sealing operation have become more critical. Trouble on the filling line has often been traced to variation in these forces.

The Ohio Boxboard Score Bend Tester was developed over a period of



several years by Ohio Boxboard Co. technical and carton production people working closely with major folding carton users.

The present instrument combines two measurements; the force necessary to "open-up" a folded carton blank and the forces necessary to fold carton flaps. The instrument has been designed as a production control tool. Ruggedness and simplicity of operation are featured and measurements are easily made by regular production workers. Forces are applied by a motor driven platen and registered on an eye level dynamometer dial. Up to 2,000 grams can be measured and cartons as large as the supergiant soap carton can be accommodated.

Those interested in obtaining more information on instrument contact the distributor; Paper Industry Instruments Inc., 3537 Lee Road, Cleveland, Ohio.

PVAc Emulsions Modified by Unique Process

A complete line of polyvinyl acetate homopolymer emulsions for the nonwoven-fabrics, paper, packaging, and general-adhesive industries is being placed on the market by Reichhold Chemicals Inc.

RCI disclosed that it is manufacturing the resins by a unique process which enables it to modify certain emulsion characteristics to meet the requirements of specific users. The process also allows production of the emulsions in tank car quantities for greater uniformity and better quality control, the firm claimed.

Among the qualities it can modify by process changes are speed of tack, water resistance, compounding characteristics, and particle size, RCI said. The first three are important in machine packaging. Water resistance also is a factor in paper and textile applications. Controlled variation of particle size and certain other qualities enables PVAc emulsions to impart specific "hands" to textiles.

In addition to serving as paper adhesives, PVAc emulsions are used for both coating and impregnating paper. They stiffen, strengthen, grease-proof and increase the abrasion resistance of paper products, and make the paper heat-sealable. Paper board impregnated with a PVAc emulsion is tough and flexible and has a number of artificial-leather applications.

In high-speed machine packaging, the Plyamuls' fast tack makes it possible to seal folding boxes with one quick application of pressure.

20% of Nation's Paraffin Wax Used by Canco

Paraffin wax, once largely unused by-product of the oil refineries, has become, in the past generation, a major raw material for many industries.

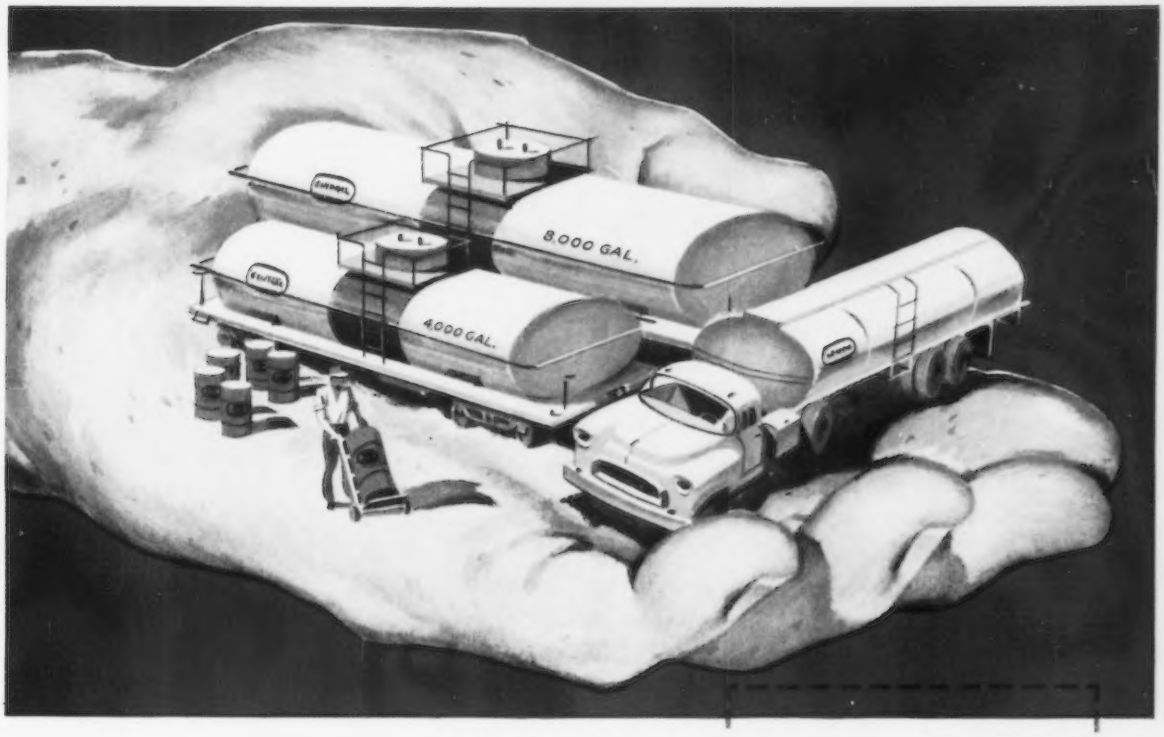
Today, the total nation-wide consumption of 400,000 tons of fully refined paraffin wax represents over $60,000,000 annually in sales. More than 20 per cent of this total, or in excess of 82,000 tons, is used by the American Can Co., a major manufacturer of fiber milk containers and paper cups that require a paraffin coating.

For example, Canco points out it consumed only 2,000 tons of paraffin in 1937 and 21,000 tons as recently as 10 years ago.

Allied Container's New Box Plant Now Open

New England's newest, largest and most modern corrugated box manufacturing plant officially opens April 17, on Route 128 at Route 1 in Dedham, Mass.

The multimillion dollar structure will be occupied by Allied Container Corp., a subsidiary of Union Bag-Camp Paper Corp. It contains more than 200,000 square feet, or five acres, of floor space and is located on 13.2 acres of land.



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Present Treatment Practice of Kraft Mills on Air-Borne Effluents

Nicholas J. Lardieri
National Council for Stream Improvement, Inc.
New York, N. Y.

This report contains results obtained by National Council engineers from an extensive survey of United States kraft mills. The survey was to ascertain what methods are used for treatment of atmospheric effluents from kraft pulping. In addition to technical considerations, inquiries were made concerning public relations aspects. 58 mills participated. Treatment methods used for various effluents are summarized and details are given of the more recent techniques. Data is also presented on the costs of treatment equipment.

As part of its atmospheric study program, the National Council for Stream Improvement has been conducting a survey of the kraft pulping industry in the United States. While it was realized that air pollution problems may exist in other segments of the pulping industry—notably sulphite, and with increasing use of recovery systems, semi-chemical—the survey has been limited to kraft at the start because of its dominance and the unfortunate notoriety its operations have acquired with the general public. It was the purpose of the survey, in respect to which most mills were individually visited by Council engineers, to obtain basic information concerning the disposal of air-borne effluents within the industry. In addition to data on recovery processes and abatement methods, the survey also sought to determine of what magnitude the air pollution problem was to the kraft industry at this time. Mill representatives were questioned about the type and severity of the general public's complaints. Also what the history of the mill had been with regard to legal actions.

A total of 58 mills participated in the survey with the following geographical breakdown:

Southern and Southeast	42
Pacific Coast	7
Northeast	7
Midwest	2

In the following report, the results obtained with regard to the emission of particulate, aerosol, and gaseous contaminants are summarized. The types of recovery equipment used, specific abatement techniques for various effluents, costs of abatement processes, and the public relations aspects of the problem, are all considered.

Sources and Composition of Air-Borne Effluents

While the precise indentification of air-borne effluents from kraft mill operations is not known and is, in fact, a primary task of National Council atmospheric research projects at the University of Florida and Washington State College, some data *(1)* is available concerning the composition of these wastes. It may be well, therefore, before proceeding with the actual survey results, to review briefly the kraft pulping process and the major sources of air-borne effluents from it.

For the purposes of this discussion the operations may be divided into three main categories: 1—digestion, 2—chemical recovery and 3— auxiliary power generation. These processes are shown diagrammatically in Figures 1-3, together with the primary constituents known to be present in these effluents.

From the digestion process shown in Figure 1, contaminants are limited to gases which evolve during digestion and subsequent blowing of digester contents. The main constituents of these digester relief and blow gases are hydrogen sulphite, methyl mercaptan, dimethyl sulphide, and dimethyl disulphide. Some reduction in the amounts emitted is obtained where turpentine recovery is practiced, although, the vent on this system is a strong odor source even

TABLE I—EQUIPMENT USED FOR COLLECTION OF PARTICULATE MATTER AND AEROSOLS

Process	Number
Recovery Furnace Stacks	
1. Electrostatic Precipitators	50
2. Venturi Scrubbers	9
3. No Equipment	2
Lime Kiln Exhaust	
1. Wet Scrubbers	54
2. Dry Dust Collector	1
3. No Equipment	1
4. No Lime Kiln	2

though of limited volume. Condensate from the blow gas heat recovery system contains all of the above mentioned compounds though in lesser concentration. Objectionable areal concentrations of these compounds often build up in the area of sewers and outfalls where these condensates are discharged.

Gaseous, aerosol, and particulate matter are discharged in the chemical recovery processes considered integral to kraft pulping as is shown in Figure 2. Condensate from black liquor multiple effect evaporators contains hydrogen sulphide methyl mercaptan, and dimethyl disulphide. The latter two compounds are present in lower proportionate concentrations than are found in cooking gases. The burning of black liquor results in the discharge of some sodium salt fumes which pass through air cleaning equipment. These sodium compounds are primarily sodium sulphate and carbonate. This stack gas also contains hydrogen sulphide and minor amounts of methyl mercaptan and dimethyl disulphide. Some particulate matter is discharged from the lime kiln and minor quantities of hydrogen sulphide are evolved.

There are a number of other sources (2) from which odors and particulates may be released in the kraft process including:

1—Dissolving tank
2—Lime slaker
3—Lime mud filter
4—Brown stock knotter and washer and screens
5—Salt cake and lime unloading systems

While odors from these sources may cause some objectionable conditions within the plant area, they would not appear to be as significant from an air pollution standpoint as the previously mentioned sources. It should also be mentioned that a serious form of air pollution may occur from the impoundment of spent process waters. Considerable amounts of hydrogen sulphide may be generated where anaerobic conditions are allowed to develop. Nuisance complaints and severe cases of house blackening have resulted in some areas. This report, however, will be limited to a discussion of atmospheric effluents derived from the kraft operation proper.

Finally, air-borne contaminants are contributed from auxiliary power generation equipment. This may consist of very fine particulate matter escaping collection equipment on bark boilers, and fly ash where coal is used as the primary power generating fuel, see Figure 3. In the latter case, appreciable quantities of sulphur dioxide may also be discharged.

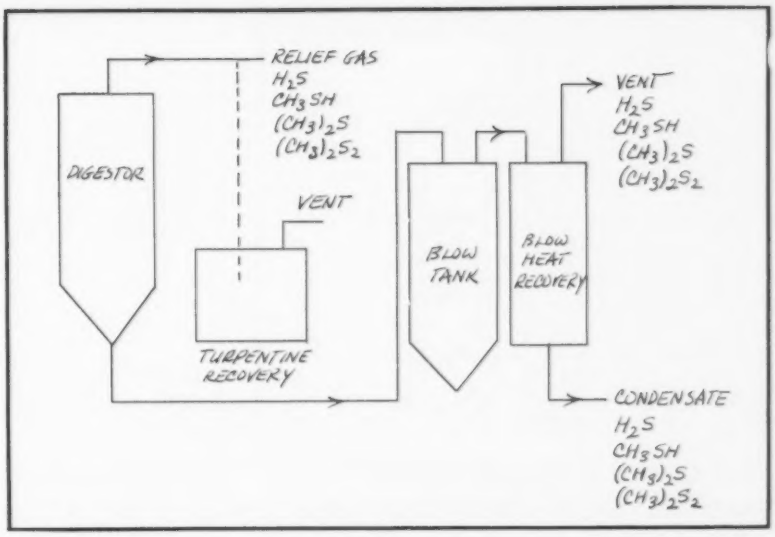

FIGURE 1—Release of atmospheric effluents from kraft digestion.

Discharge of Particulate Matter and Aerosols

Most mills in the survey—43—use various types of electrostatic precipitators as the basic recovery unit in furnace stacks as shown in Table I. These units are designed for collection efficiencies of 90 to 98 per cent and were found to meet these specifications if not overloaded. Both dry and wet bottom types of precipitators are now in use. In the wet bottom units, black liquor from the multiple effect evaporators is pumped into the bottom of the precipitators, where it receives the recovered sodium salts. The flowing black liquor is agitated to keep the particles in suspension or solution. The black liquor then flows through cascade or disc evaporators before being sprayed into the recovery furnaces. This wet collection unit is apparently preferred over the dry bottom precipitators as most of the recent installations are of this type.

Compartmented precipitators are also coming into increasing favor over the single chamber type. These units have the decided advantage of being able to maintain partial collection efficiency during breakdowns or repairs in one or more of the chambers.

The other basic recovery unit used in the kraft industry is the Venturi evaporator scrubber. Nine of the mills were found to have this system; at three mills both scrubbers and precipitators are used. This process (Figure 4) operates on the principle of using the energy of the furnace stack gas accelerated in a Venturi throat to atomize streams of black liquor injected into this high velocity stream. This

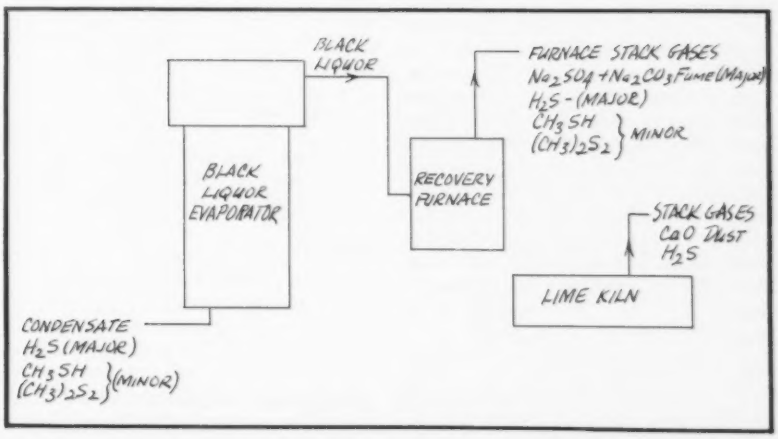

FIGURE 2—Release of atmospheric effluents from kraft chemical recovery process.

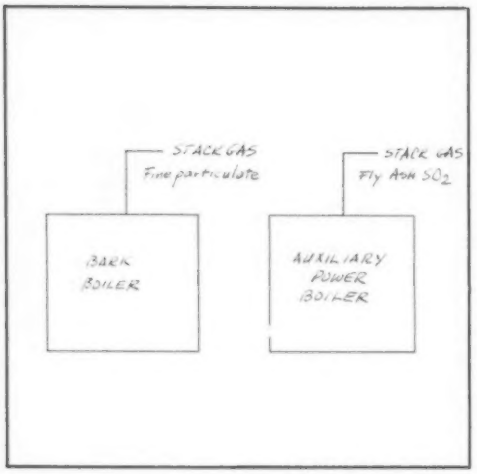

FIGURE 3—Atmospheric effluents from auxiliary power generation.

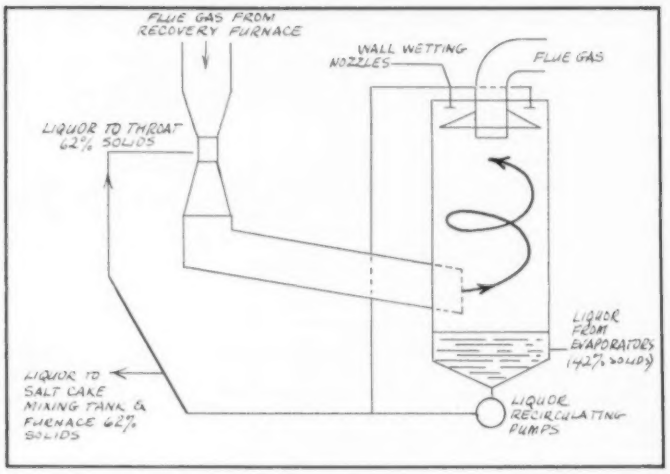
FLUE GAS FROM RECOVERY FURNACE
WALL WETTING NOZZLES
FLUE GAS
LIQUOR TO THROAT 62% SOLIDS
LIQUOR FROM EVAPORATORS (42% SOLIDS)
LIQUOR TO SALT CAKE MIXING TANK & FURNACE 62% SOLIDS
LIQUOR RECIRCULATING PUMPS

FIGURE 4—Venturi evaporator-scrubber.

mixture of flue gas, water vapor, and concentrated liquor droplets, is conveyed to a cyclone separator where the liquor droplets with fume particles are separated from the flue gases by collecting on the walls of the cyclone. The walls of the cyclone are washed continuously with a flow of concentrated black liquor admitted through wall-wetting nozzles which are located at the top of the separator.

Fume collection efficiencies of 85 to 90 per cent are reported for the process which is below that of electrostatic precipitators. The advantages claimed *(3)* for the Venturi scrubber are lower capital investment required, simplicity of operation and control, and higher heat recovery than obtained with electrostatic units. A major disadvantage of the scrubber is the considerably higher power cost over that of electrostatic units. From an air pollution standpoint, there would appear to be both advantages and disadvantages to the Venturi scrubber. The collection of fume is less than with precipitators but there is probably considerable absorption of the sulphur gases in the stack effluent as a result of the black liquor scrubbing. It has also been reported that the overall downtime of the Venturi system is less than that of precipitators. With the latter units, there is more likelihood of creating temporarily objectionable atmospheric conditions due to breakdowns and a greater need, therefore, for standby equipment. This is a facet of the air pollution situation that needs to be closely evaluated.

Lime Kiln Exhaust

While minor amounts of hydrogen sulphide may be emitted from lime kiln operations, the main problem is collection of a relatively coarse particulate when compared with salt-cake fume. With but a single exception, all mills surveyed had recovery equipment on these exhausts. The processes used are summarized in Table I.

These figures show that with one exception all mills surveyed had air cleaning equipment on their kiln exhaust. One of the mills had a dry dust collector, while in 54 mills wet collection was employed. These wet collectors were of the spray tower or cyclone type. The efficiency of collection was reported to be between 90 and 97 per cent with the higher values for the cyclonic type. A trend was noted toward the replacement of "home-made" spray towers by cyclonic collectors. This type is being installed in a majority of the new lime kilns.

Discharge of Gaseous Effluents

The emission of odorous compounds from the kraft industry occurs primarily from two phases of the process:

1—Digestion
2—Chemical recovery

These will be discussed separately below together with some of the techniques used in the industry to ameliorate the effect of these discharges.

Digestion Odors

Some reduction in the emission of odorous compounds from digester gases is obtained in most Southern kraft mills through the turpentine recovery system. The woods used by the Southern mills are especially adaptable to this by-product recovery because of their high turpentine and rosin content. Unfortunately, the principal odor-producing constituents formed during cooking, methyl mercaptan, dimethyl sulphide and hydrogen sulphide, have boiling points well below that of turpentine and do not condense out at this point.

Several treatment methods are employed by mills to minimize the effect of objectionable relief and blow gas discharges. Non-condensable relief gases at one mill are collected and burned in the lime kiln. Blow gases at another location are passed through jet condensers. The water from the process containing the condensed gases is then stripped with air and an odor-masking compound. The use of these agents will be discussed subsequently in this report.

Burning of relief and blow gases is probably most advanced at a West Coast mill visited. A flow sheet of this treatment system is shown in Figure 5.

Here, gases from both sources are collected in a fabric diaphragm enclosed in a steel sphere and then burned in a furnace. Turpentine from the decanters is used as the fuel supply. Experimental results indicate that all organic sulphides are destroyed at 1200° F. The furnace is, therefore, being operated at a temperature of 1400°F. to ensure the complete conversion of sulphur compounds to sulphur dioxide.

This drawing also illustrates an industry practice of using waste bleach effluents to oxidize odorous sulphur compounds. In this particular instance, gases from the "Vaporsphere" are introduced into the dropleg of the chlorination washer. The turbulence in the dropleg gives good mixing, and complete oxidation of the sulphur gases is reported *(4)*.

At a northeastern mill, bleach washer white water is used for scrubbing in a specially constructed tower as is shown in Figure 6. Here a 30-inch diameter rubber-lined tower is packed

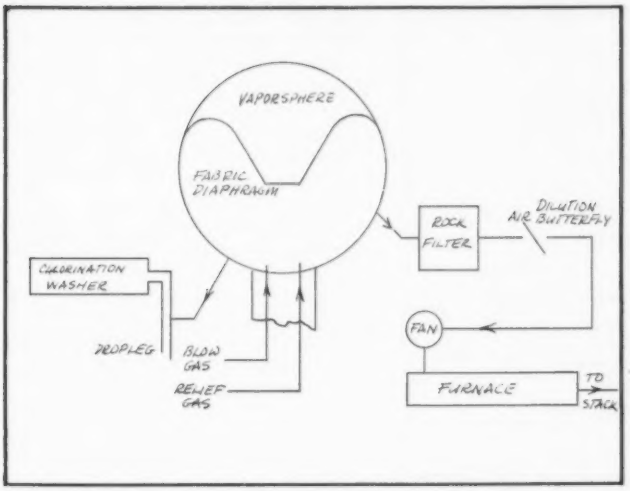

FIGURE 5—Burning and chlorination of kraft mill non-condensable gases.

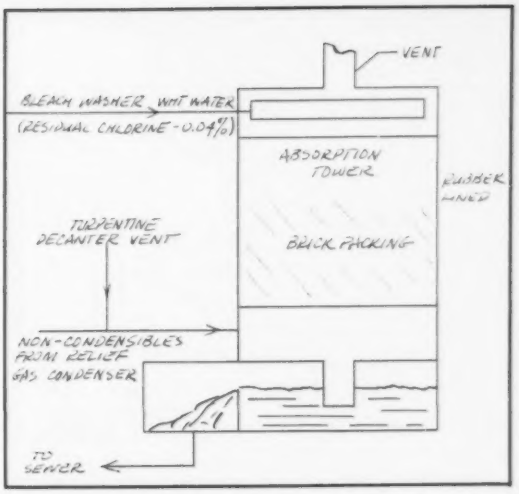

FIGURE 6—Oxidation of non-condensables using bleach effluent.

with approximately 12 feet of spiral brick, and 100 g.p.m. of bleach washer white water is used as the scrubbing medium. The residual chlorine content of this water is about 400 p.p.m. The gases scrubbed are the non-condensables from the relief steam condenser, turpentine decanter and storage vents. Anywhere from 90 to 100 per cent of the residual chlorine is consumed in the process, and in the opinion of mill personnel, it has considerably ameliorated the odor problem.

Absorption of sulphur compounds with caustic solutions is being used at several installations with some success. Both cool caustic soda and black liquor have served as the absorbing medium.

Chemical Recovery Odors

Odors from the black liquor recovery systems arise from the multiple effect evaporator condensates and from the furnace stacks. Methods employed to abate or ameliorate odors from these sources are:

1—Scrubbing of evaporator non-condensables with caustic or black liquor.
2—Air oxidation of black liquor prior to recovery.
3—Use of odor masking of catalytic reactant compounds.

Nine of the mills surveyed use black liquor oxidation towers; six of these mills were in the Southern region and three on the West Coast. In theory, black liquor oxidation results in the oxidation of volatile sulphur compounds to more stable forms, which then makes their release to the atmosphere less likely during subsequent evaporation and burning. Tower oxidation of black liquor is accomplished with air alone or with a mixture of air and digester relief and blow gases. In the latter case, a dual purpose is served as the objectionable sulphur compounds from these sources are absorbed to a considerable degree. This type of black liquor oxidation process, which is used in one of the mills surveyed, is the patented British Columbia Research Council system *(5)*. A line drawing of this process is shown in Figure 7. Here twin towers containing large numbers of vertical, parallel plates of asbestos cement are used. The plates bear an imprint on their surface which is intended to distribute the liquor and retard its descent. A forced draft fan which supplies air to the tower draws it through a duct which is connected into the hot water accumulator vent pipe. In this way, the non-condensables are mixed with large quantities of dilution air, minimizing explosion hazards. Black liquor and the diluted non-condensables proceed concurrently down the tower. This is supposed to have an advantage over counter-current flow where air is brought into contact with unoxidized and malodorous black liquor immediately before discharge and leaves in a fairly contaminated state.

It has been reported that black liquor oxidation results in almost the complete removal of hydrogen sulphide but that much of the methyl mercaptan appears in the tower effluent as the oxidized form, dimethyl disulphide. This latter compound has a higher threshold odor value then methyl mercaptan but is still objectionable. In the opinion of some Southern mill personnel, the foaming properties of black liquors from this region are an obstacle to more widespread usage of the oxidation technique. Published data *(6)* shows that black liquors from the pulping of Southern pine has about ten times the foaming propensities of Canadian pine and, it may be assumed, woods from the Pacific Northwest.

Odor-masking or counteractant compounds were being used routinely in three of the mills visited, and intermittently in another. Six other mills reported having experimented with a number of these compounds. These reagents are usually placed in the digesters and thus carry through the entire process. In one mill they are used to "deodorize" caustic solutions being stripped of malodorous sulphur compounds.

There was much conflicting opinion regarding the effectiveness of this air pollution abatement method. In several instances, there appeared to be no observable diminution in kraft odor around the area where those compounds were being used. At another mill, use of an odor-masking agent appeared to be effective in reducing the intensity of digester gas odor but was of little benefit in the chemical recovery stack. The effectiveness of these compounds appears to be dependent on such factors as terrain, climatic conditions, and also the degree of control practiced in their application. For example, there were numerous complaints regarding the odor of the odor counteractant if too great a quantity was added. The evaluation of all these methods, unfortunately, is made difficult by the very nature of odor detection. There are no quantitative odor measurement methods that do not eventually depend on the nose of the observer as the sensing unit. It would seem, therefore, that the masking or substitution of odors does not provide a permanent solution, although, temporary remedial

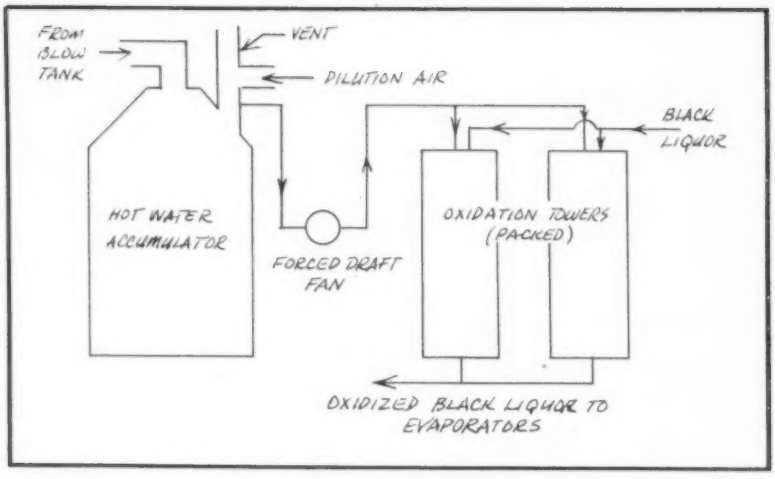

FIGURE 7—Black liquor oxidation system (British Columbia Research Council).

action may be obtained with little capital investment. The cost of using these compounds is placed at 20 to 30 cents per ton of production.

The odor-masking compounds are to be distinguished from the catalytic reactants which operate on the principle of promoting oxidation of the odorous sulphur compounds to stabilized forms of sulphur. A specific compound of this type, used in three of the mills visited, was an organic peroxide. Here again, a wide range of opinion was expressed in regard to effectiveness. One mill reported that the concentration of H_2S in stack gas was reduced from 100 p.p.m. to trace quantities as a result of spraying this compound into the stack. At another mill, its use was not considered as effective, while at the third mill, completely ineffective. This theory of treatment does appear to have merit, however, and is one of the subjects to be studied in the Washington State College Atmospheric Study Project.

Costs of Air Pollution Control Equipment

While it is recognized that recovery equipment on black liquor furnaces and lime kilns is now considered an integral part of the kraft pulping process, it is equally true, that use of these devices greatly reduces the amount of contaminant materials discharged from the operation. In addition to pulp mill equipment, the mills, with but several exceptions, were found to have dust and fly ash equipment in the power plant where bark and/or coal was used.

The capital costs for the equipment used by the mills surveyed may be broken down as follows:

1—Electrostatic Precipitators and Venturi Scrubbers for Recovery Furnace Stack Gases	$24,142,000
2—Lime Kiln Exhaust Equipment	2,661,000
3—Black Liquor Oxidation Towers, Chlorination Towers, and other Control Methods for Sulphur Compounds	1,885,000
4—Stack Gas Cleaning Equipment on Fuel and Bark Boilers	1,973,000
TOTAL	$30,661,000

Since the combined production of the mills surveyed is 34,765 tons per day, it may be estimated that about $1000 per ton of productive capacity was spent on equipment and processes which result in decreased air pollution from kraft mills. It may be stated that current costs of this equipment would be considerably in excess of this.

The combined yearly cost of odor-masking and reactant compounds for the three mills using these materials was approximately $200,000.

Research on Atmospheric Effluents

It was found by Council engineers that considerable independent research was being conducted by the kraft industry on atmospheric discharges and related problems. The research by mills on various types of odor counteractants and reactants has been previously mentioned. In addition to the trial of various compounds, study is being given to the methods by which these materials may most effectively be added.

A number of mills conduct recovery equipment efficiency tests on a routine basis, and a trend was noted toward the analyses of particulate matter being discharged. At two mills, programs dealing with the factors affecting precipitator efficiency are underway. Experimental work is also being conducted on sulphur dioxide and sulphite removal.

Much work is being done on the treatment of specific effluents. These programs include: 1—The collection and burning of digester relief and blow gases, 2—chlorination of non-condensable gases, and 3—scrubbing of green liquor dissolving tank discharges.

Of considerable interest and significance from an air pollution standpoint is the research that has been conducted at two Southern kraft mills on the wet scrubbing of effluents from electrostatic precipitators. At one mill, soda ash solutions were used in the pilot scrubber, while at the other, various caustic liquors present at different stages in the kraft process were used. Results of the pilot tests are currently being evaluated but appear to hold promise for chemical recovery as well as air pollution reduction. A successful full scale wet scrubber for precipitator effluents from soda pulping has also recently been reported *(7)*.

Three mills reported that research was conducted before construction of recovery systems to ascertain a stack height that would minimize the effect of atmospheric discharges in neighboring areas. Also, at two locations, surveys are being made of the fallout resulting from mill operations. In one instance, sampling buckets have been placed at fourteen locations in the surrounding areas, and the amounts and character of the material settling out is being determined.

Public Relations Aspects

At most of the mills visited, it was found that the nature of complaints by area residents concerning the emission of contaminants was relatively mild. This may be due largely to the remote geographical locations of many mills and the economic dependency of the resident population on the mill. Also, many Southern mills are situated in flat country which is subject to few temperature inversions. It is the latter climatic phenomenon that often results in the build-up of objectionable concentrations of contaminants in other locales.

Complaints of local residents appear to be most closely associated with purported paint damage to automobiles as a result of soda and lime discharges. While some mills have settled claims out of court, in the only case that went to trial, the verdict was in favor of the company. The installation of car

washers has proven a very effective means of reducing complaints from this source and is almost universally practiced at Southern mills. There have been a number of house paint blackening complaints. This damage may occur from hydrogen sulphide generation in waste water lagooning areas as well as direct pulping operations. Several of the mills have recommended that area residents use titanium instead of lead base paints to prevent the possible formation of lead sulphide.

Law suits against mills for damages resulting from air pollution were reported at only three of the mills visited. In one case, the verdict was against a plaintiff suing a pulp mill for paint damage to buildings. The most recent suit was against a West Coast kraft mill. In this case, a suit for $33,000 was brought for alleged physical and real property damages and also for devaluation of property. While the United States Circuit Court ruled that proof of physical injury to the plaintiffs, and damage to real property was "tenuous and unsubstantial," he awarded $1,800 nominal damages on the basis that the "operation of the pulp mill constituted a public nuisance". This decision is currently being appealed by the company, and the subsequent ruling will have wide implications for the pulp and paper, as well as many other industries.

Summary

It may be stated on the basis of this survey that generally the kraft industry does not have a critical air pollution problem at this time. This is due primarily to the high efficiency air cleaning equipment used in the various stages of the kraft process. Capital costs of this equipment have been shown to be about one thousand dollars per ton of productive capacity.

Increasing public interest in air pollution matters—both legislative and publicity wise—however, are expected to focus more attention on aspects of kraft pulping effluents which may be objectionable. In view of the liberal interpretation that may be given the commonly accepted legislative definition of air pollution "as the presence of substances in the outdoor atmosphere which are injurious to health, property, or unreasonably interfere with the comfortable enjoyment of life and property," the aesthetic aspects of atmospheric discharges may become of prime importance to the industry. That a large percentage of the kraft industry is aware of these considerations is evidenced by the installation of equipment and processes to abate odor and particulate matter discharge, and by the research being conducted on all phases of the problem.

References

(1) McCarthy, J. L. Peniston, Q. P., Felicetta, V. F., "Determination of Hydrogen Sulphide, Methyl Mercaptan, Dimethyl Sulphide, Dimethyl Disulphide in Kraft Pulp Mill Process Streams". *Tappi*, 36, 425, 1953.

(2) Wright, R. H., "Is it Possible to Build and Operate a Completely Odorless Kraft Mill", *Canadian Pulp and Paper Industry*, September, 1957.

(3) West, P. H., "Chemical and Heat Recovery with the Venturi Scrubber at Thilmany", *Tappi*, 38, 399, 1955.

(4) DeHaas, G. G. and Hansen, G. A., "The Abatement of Kraft Pulp Mill Odors by Burning". *Tappi*, 38, 732, 1955.

(5) Wright, R. H. and Klinck, R. W., "What Port Alberni Has Done to Control Odors", *Paper Trade Journal*, October 10, 1955.

(6) Collins, T. T., Jr., "The Oxidation of Sulphate Black Liquor and Related Problems", *Tappi*, 38, 172A, 1955.

(7) "How Mead Eliminated Recovery Stack Snow at Kingsport". *Paper Trade Journal*, October 7, 1957, page 48.

Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures

(Production as percent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

1958	March 1 89.9	March 8 86.7	March 15 90.5	March 22 91.0r	March 29 90.5
1957	March 2 96.1	March 9 97.6	March 16 96.9	March 23 96.8	March 30 97.2

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1958	85.5‡	88.5‡	—	—	—	—	—	—	—	—	—	—	—
1957	94.2	97.0	97.1	94.0	94.6	93.3	75.6	92.7	86.0	93.0	90.7	81.5	90.9

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1951	1952	1953	1954	1955	1956	1957	1958
Year to Date	100.2	97.0	94.6	94.1	95.3	101.2	95.9	87.5
Year Average	98.0	88.6	92.3	91.6	94.0	97.9	90.9	

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn.

COMPARATIVE WEEKLY SUMMARIES

1958	March 1 86	March 8 87	March 15 89	March 22 88	March 29 86
1957	March 2 92	March 9 95	March 16 95	March 23 95	March 30 92

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1958	80	86	—	—	—	—	—	—	—	—	—	—	—
1957	91	94	94	92	93	91	72	94	91	97	92	79	90

† *Percents of operation based on "Inch-Hours" reported on a 6-day basis.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	THIS WEEK ENDING	LAST WEEK ENDING	CUMULATIVE TO DATE Jan. 1 to
	Mar. 29, 1958	Mar. 22, 1958	Mar. 29, 1958
% Activity	86%	88%	86%
	Tons	*Tons*	*Tons*
Total Production	268,648	273,800	3,266,020
Liner	83,676	95,915	1,061,374
Corrugating Material	40,581	38,696	483,564
Chip & Filler Board	5,022	4,499	53,395
Total Containerboard	129,279	139,110	1,598,333
Folding	55,192	51,944	650,756
Set-Up	10,122	11,399	126,742
Special Food Board	27,453	26,544	305,725
Other	46,602	44,803	584,464
Total Boxboard	139,369	134,690	1,667,687
Total Orders	*Tons*	*Tons*	
Received	259,355	239,605	
Unfilled End of Week	351,889	359,226	

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SF Flakt Dryer, Type L, introduces a uniquely advanced concept of paper pulp drying: working with hot air at atmospheric pressure, the type L Flakt Dryer features an *air borne* pulp sheet floating through the dryer without the help of any mechanical conveyor.

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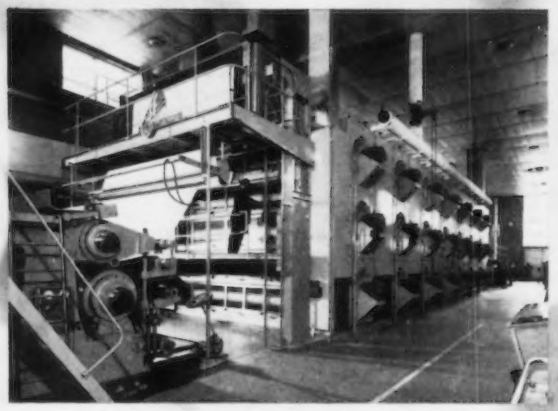
NEW: **SMALLER OVER-ALL DIMENSIONS** save valuable floor space. The new air circulation system gives a considerably increased drying effect, thereby reducing the length of the unit.

NEW: **LESS MAINTENANCE.** The absence of a mechanical conveyor system saves man-hours spent on lubrication and maintenance. Expensive production gaps because of conveyor changes are eliminated.

NEW: **AUTOMATIC THREADING,** Flakt Dryer, Type L, can be provided with automatic threading.



SF Flakt Dryer, type L, with 11 decks, designed for drying 110 short tons of pulp per day from 45% BD to 90 BD. Main dimensions: length 55', width 20', height 18'. In operation at Oskarström Sulphite Mills AB, Sweden, since the beginning of 1956.

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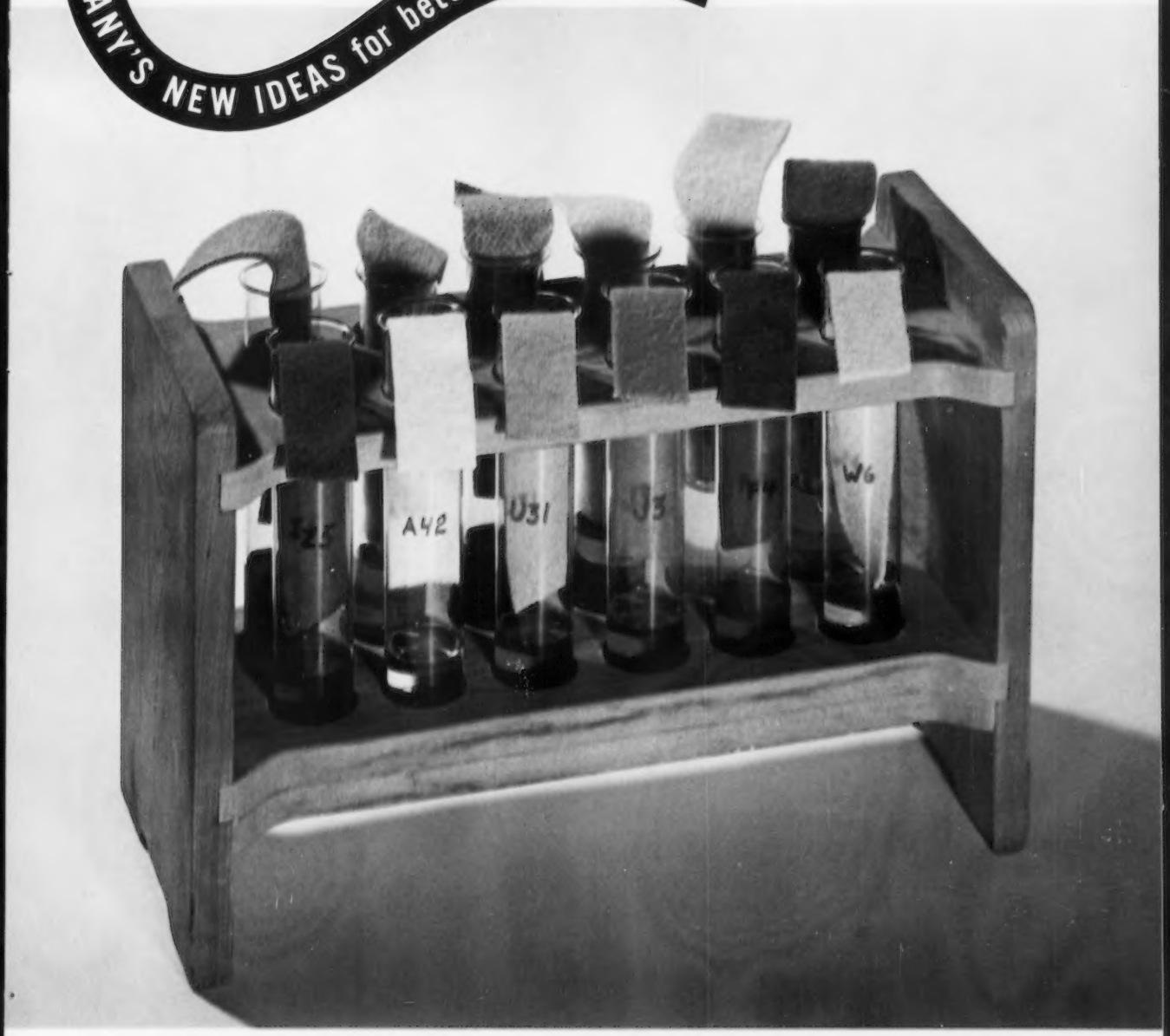

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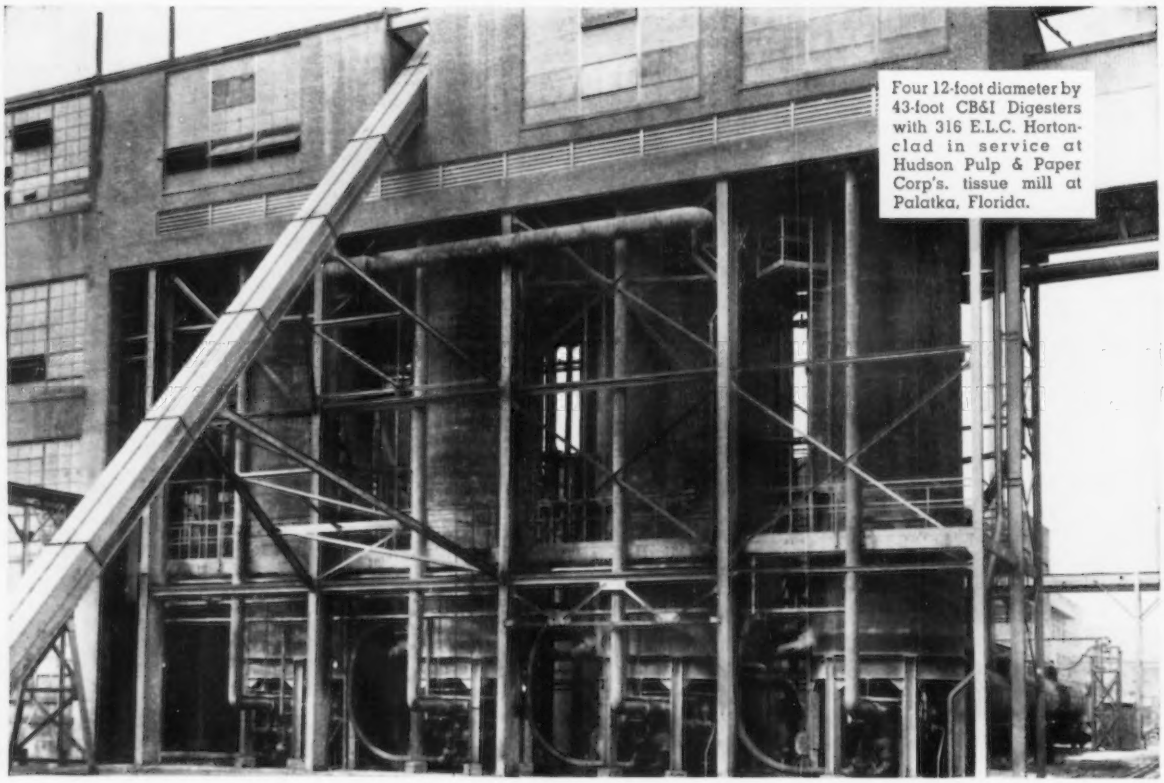

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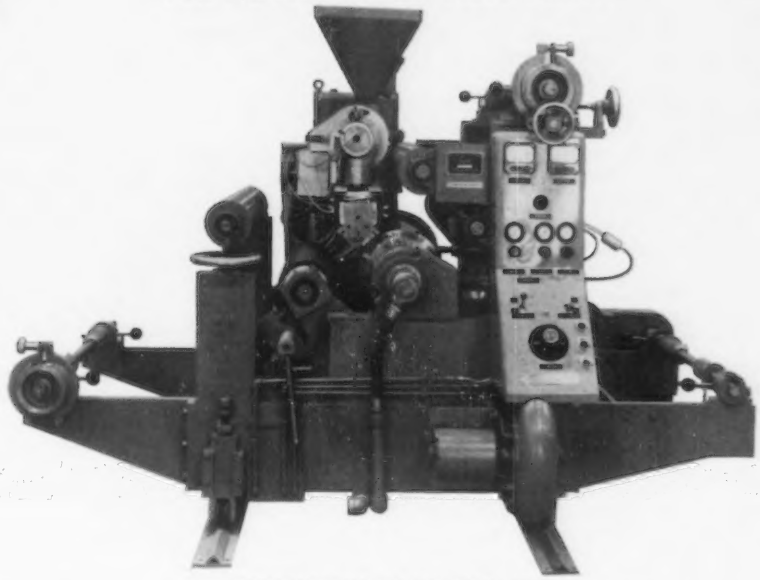

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Your White Water Tank Design Can Be Improved

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Undesirable accumulations of solids commonly occur in paper and board mill white water tanks. These create operating problems of considerable extent and result in losses of both labor and material. The troublesome masses segregate from the white water by both sedimentation and flotation. Deposition of solids, a consequence of the characteristically large size of white water tanks, generally prohibits full white water reuse. Flotation of solids, caused mainly by air entrainment in the white water either prior to or during introduction to the tank, generally thwarts white water solids recovery, a primary white water tank function.

These difficulties can be eliminated, or at any rate minimized, through improved white water tank design. Recommendations to this end are presented here together with a discussion of related factors.

Adverse Effects of Accumulated Solids

Solids accumulations in white water tanks result in many disadvantges. First and foremost of these is the limitation imposed on white water reuse by deposited solids. Other adverse effects are loss of white water solids by flotation, white water degradation, and the necessity for frequent white water tank washups. These are briefly discussed below:

Deposited Solids Restrict White Water Reuse

In many instances white water, although otherwise suitable, is not reused at certain points in the stock preparation and paper machine systems because of the possibility of fouling the stock or clogging the white water lines by occasional clumps of previously deposited solids. Such limitation of white water reuse seriously reduces the day by day effectiveness of the white water system. Recovery of white water solids, chemicals, and heat are reduced, and fresh water consumption is increased. In addition, the required capacity of any saveall or treatment device handling white water tank overflow is correspondingly increased.

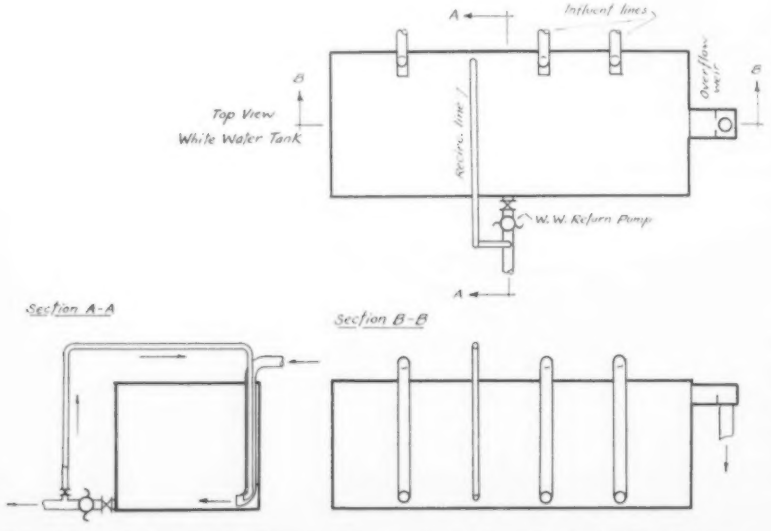

FIGURE 1—Submerged influent and recirculation lines for hydraulic mixing.

Solids Lost by Flotation

When flotation occurs in white water tanks of common design, the tank overflow is rich in fiber and other white water solids. In many such cases the solids content of the overflow is higher than that of the white water returned to the system. Excessive solids loss results, unless the overflow is subsequently processed through a saveall or other solids recovery device.

White Water Degradation

Solids accumulations (both deposited and floating) provide food and undisturbed conditions, a favorable climate for bacterial growth. Bacterial decomposition not only renders these solids unsuitable for reuse, but also results in colloidal and dissolved byproducts which leech out into the surrounding white water. In serious cases odors may also be imparted to the white water. As a result of this contamination, the white water is downgraded in quality.

Frequent Washups Necessary

To accommodate even limited white water reuse frequent flushing of the deposited solids from the white water tank is necessary. Time and manpower are required and in isolated instances machine operation may be interrupted. The accumulated solids plus those which would have been recovered, but for the washup, are lost to the system forever. At the same time, an added solids load is placed on the waste water treatment system, if one exists, or the receiving stream.

In total, therefore, the undesirable effects of solids accumulations in white water tanks are far-reaching and profound. They warrant serious consideration of counter-acting measures.

General Considerations

White water tanks, as used throughout the paper and board industries, are of varied size and configuration. Frequently the largest available tank is used, or the largest available space is

converted to use, as a white water tank. Small receivers, which serve merely as sumps for the white water return pumps, are also widely referred to as white water tanks. However, the latter units are excluded from this discussion since solids segregation does not occur therein.

The primary functions of white water tanks are storage of white water for subsequent reuse, and recovery of fiber and other white water solids. These uses are basically not in harmony since high storage capacity simultaneously creates conditions favorable to solids segregation and (except in specially designed units) makes collection of the segregated solids difficult. Unless special provision is made for positive solids removal, segregation of solids results in reduced white water solids recovery, as previously indicated. Only by attention to tank details can white water storage and solids recovery be made compatible. Two diametrically opposite approaches are available. Solids segregation can either be discouraged in the first place by preventative and ameliorating measures, or encouraged and turned to advantage by provision for positive removal of the segregated solids. In general, the former method (because of its relative simplicity) is the more feasible one to apply to existing flat-bottom tanks.

The latter technique is more applicable to existing hopper bottom tanks and proposed units which can be suitably designed. However, other factors such as tank size in reference to influent flow, and the desired characteristics of the return and overflow white water are important in determining the more advantageous approach in specific instances.

Segregation of solids is difficult to prevent when the white water tank is large in comparison to the influent flow. In such cases, enhancement of the conditions contributing to solids segregation and provision for positive removal of the segregated solids, is the more effective procedure, though admittedly the more expensive one due to the cost of collecting equipment.

The solids segregation method, properly applied, leads to greater recovery of white water solids, i.e., lower suspended solids concentration in the white water tank overflow. This method is advantageous therefore, in installations where white water tank overflow is sewered without further treatment.

A further consideration in determining whether to impede or promote solids segregation is the uses to which the returned white water is put. If white water is reused in the stock preparation system only, the technique of impeding solids segregation can be used to advantage. However, the opposite procedure should be used when white water is reused in showers, consistency regulators, or other devices where clogging can readily occur.

Thus, the peculiarities of the system are important in determining whether the white water tank design should be pointed toward impeding or promoting white water solids segregation. Recommended procedures for attaining these opposing ends follow.

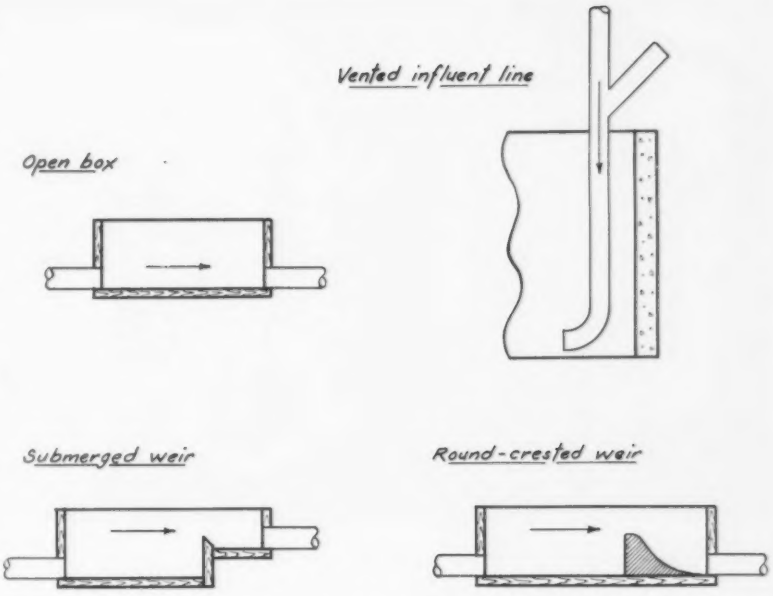

FIGURE 2—Large air bubble removal devices.

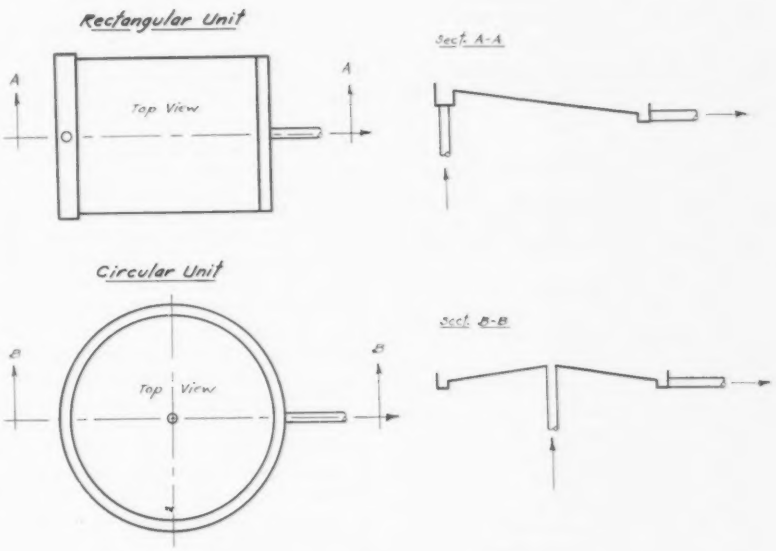

FIGURE 3—Fine air bubble removal devices.

Impeding Solids Segregation

To impede the settling and/or flotation of solids in white water tanks, a combination of preventative and remedial measures is usually required. Prevention involves selectivity in the waters handled and care in the manner of introducing and withdrawing them from the white water tank. Cures include provision for non-turbulent circulation of the white water tank contents,

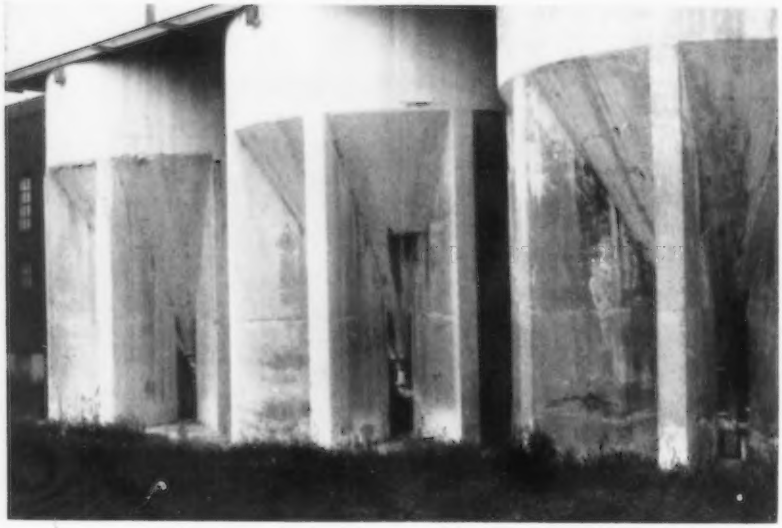

FIGURE 4—Outdoor hopper bottom white water tanks.

and deaeration of wastes containing entrained air prior to entry of these wastes to the white water tank. Through proper application of these measures both the settling and flotation tendencies of white water solids can be overcome.

Details and discussion of the appropriate techniques follow:

1—Selectivity in Wastes Handled

The first and most important step towards prevention of solids segregation is exclusion from the white water tank of discharges, which tend to form bottom deposits. Reference is made in particular to the rejects from board mill stock cleaning devices, which, in some instances, are flushed to the white water tank. While the inappropriateness of such practice is generally appreciated, it is resorted to for lack of a simple method of handling rejects. However, in the interest of a clog-free white water system these and other wastes which may carry heavy solids, such as machine room floor drainage, should be either pre-treated for removal of objectionable material, or excluded from the white water tank. Riffle boxes (preferably automatically cleaned) and vibrating screens are appropriate pretreatment devices.

Wastes containing entrained air (such as vacuum pump discharges), unless treated for air removal, should also be excluded from the white water tank, since these tend to cause solids flotation. Practice of selectivity in wastes handled in the white water tank, is an important preventative measure which can, at the outset, greatly reduce the problem of solids segregation by both settling and flotation.

2—Proper Withdrawal of Return White Water

The suction line of the white water return pump should be located so as to draw white water directly off the tank floor. Preferably, the latter should slope to the point of withdrawal. These conditions are favorable for the removal of any settled solids, as they are deposited, thus eliminating bottom accumulations in the tank.

In some installations return white water is withdrawn from a level appreciably higher than the tank floor specifically to avoid return of heavy solids. However, frequent washups are necessary if this practice is to alleviate clogging in the white water reuse system. Furthermore, since this technique does not provide positive removal of heavy solids, the restrictions imposed by the latter on white water reuse are not removed. This measure is, therefore, not a satisfactory solution to the clogging problem.

If wastes containing heavy solids are excluded from the white water tank, as recommended above, no difficulty will be encountered by the returning of white water directly from the tank bottom.

3—Circulation of White Water Tank Contents

"Dead" areas in white water tanks act as accumulators of both settled and floating solids. To eliminate these areas complete circulation of the white water tank contents is necessary. Mechanical mixing is generally not feasible due to the large size of most white water tanks. However, hydraulic mixing can be conveniently accomplished by proper distribution of the influent flows. Recirculation from the white water return pump can also be applied to cause circulation. Care must be taken that mixing is induced in a non-turbulent fashion in order to prevent solids flotation.

a) *Distribution of the influent flows*

Proper location, both laterally and vertically, of the influent flows, is essential for complete circulation of the white water tank contents. The lateral distribution should be such as to cause flow through the entire tank. In instances where there is only one influent line, for example, it should be located at one end of the tank opposite the location of white water return pump.

Vertically, the influent flows should be introduced at a level insuring submergence at all stages. Submerged influent flows offer two benefits; circulation, which impedes settling, and reduced surface turbulence; i.e., reduced solids flotation. Preferably the influent lines should be extended to the tank floor to attain maximum bottom scour. In rectangular tanks with multiple influent lines a roll can be imparted to the white water tank contents, if the flows are directed in parallel streams across the tank floor. Bottom flow should be in the direction of the white water return pump.

With submerged influent flows, prior removal of entrained or entrapped air is essential if reduced, rather than increased, solids flotation is to be effected, and to prevent flow restriction in the influent line. The techniques for air removal, subsequently described, are applicable.

b) *Recirculation*

When the white water return pump has excess capacity, recirculation to the white water tank can be practiced to promote hydraulic mixing. The recirculation line (or lines, if sufficient flow is available) should be submerged, as described above for the influent flows, and located strategically for maximum mixing effect.

Showers or jets of recirculated white water, directed at the water surface, may also be used to disperse floating solids if foam prevention measures fail.

Techniques for hydraulically inducing circulation of white water tank contents are illustrated in Figure 1. A weirbox, permitting measurement and sampling of white water tank overflow, is also shown in this illustration. If possible, this valuable adjunct to a white water tank should be set at the overflow level.

4—Air Removal

Entrained or entrapped air, if not removed prior to entry of white water to the white water tank, will result in solids flotation. This is especially true if the influent lines are submerged to

create circulation, as recommended above.

Air removal may be accomplished by exposing the white water to the atmosphere. The degree and time of exposure required for effective air removal are dependent primarily upon bubble size; i.e., the extent of turbulence causing air entrainment. Large air bubbles can be removed by momentary exposure of the flow to the atmosphere. Depth of flow is not critical. However, for removal of fine air bubbles, longer exposure time and very shallow depth are required.

The simplest technique for removal of large air bubbles, such as might be entrapped in cylinder mold discharge over the level control gate, is merely passing the flow through a small open box. Shallower depth, and hence more effective removal of large air bubbles can be obtained by directing the flow over a weir, precaution being taken to minimize overflow and downstream turbulence. Submerged weirs, i.e., weirs with the downstream water level higher than the weir crest; or round-crested weirs, i.e., weirs with downstream slopes corresponding to the path of overflow, are recommended for this purpose.

In the absence of other measures for large air bubble removal an air vent should be provided on submerged white water tank influent lines. Such provision provides some protection against solids flotation, and is necessary also from the standpoint of preventing restriction of the flow-carrying capacity of submerged lines due to entrapped air. Devices for the removal of large air bubbles are illustrated in Figure 2.

An effective technique for removal of fine air bubbles is distribution of the flow in a thin layer over a gently sloping surface of appreciable area. The important requisites are uniform flow distribution and sufficient area for "spreading" the flow. This method, which is applicable to vacuum pump discharges, pumped air-water mixtures, and, in some instances, machine white water, is depicted in Figure 3.

Promoting Solids Segregation

As previously indicated, conditions favorable to solids segregation by sedimentation and/or flotation exist in many white water tank installations. By modification of these conditions from favorable to optimum, the tendency toward solids segregation may be turned to advantage. To accomplish this, sedimentation and flotation tank design practices should be applied. The principal requirements are reduction of turbulence to a minimum and provision for positive and continuous removal of the segregated solids as they accumulate.

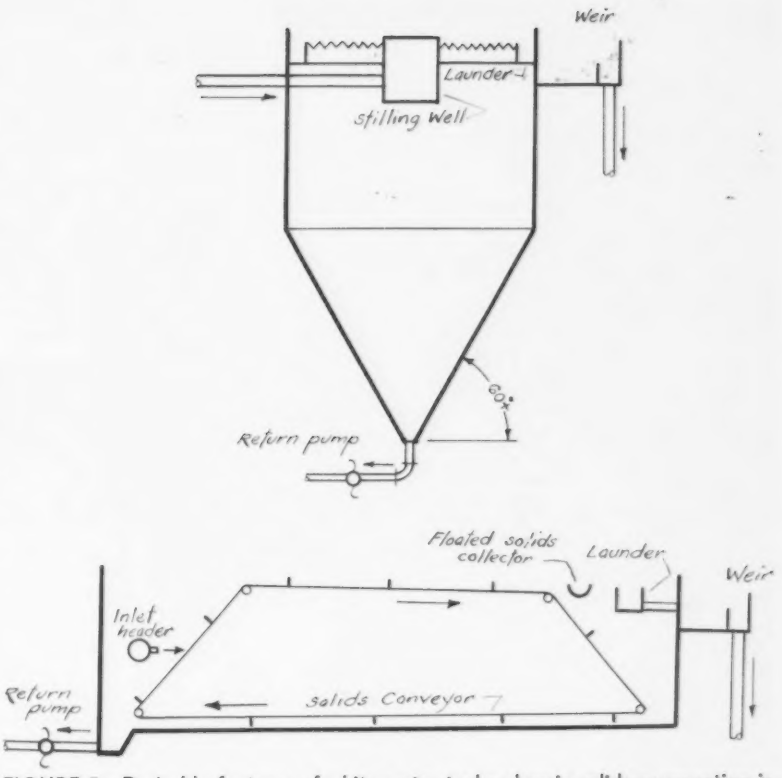

FIGURE 5—Desirable features of white water tanks wherein solids segregation is promoted. Above, circular or square tanks. Below, rectangular tanks.

1—Reduction of Turbulence

Turbulence can be minimized by providing favorable inlet and outlet conditions, and (when flotation is to be discouraged) by removal of entrained or entrapped air from the white water ahead of the inlet. In rectangular tanks an inlet header should be used to distribute the flow uniformly across the full tank width. In square or circular tanks the flow should enter through a center stilling well for optimum flow distribution. The inlet should be located a few feet below tank overflow level in each case. For optimum outlet conditions overflow launders should be used rather than single overflow pipes. These result in reduced overflow velocities, i.e., reduced solids carryover. Peripheral launders, in round or square tanks, and full width, double-overflow, launders, in rectangular tanks, should be used. In tanks wherein flotation of solids is encouraged, baffles should be set ahead of the launders to prevent solids carryover.

2—Removal of Segregated Solids

For positive removal of deposited solids the tanks should either have hopper bottoms (circular or square tanks) or be equipped with conveyors for removal of deposited solids. Hopper bottom tanks should have smooth floors at an angle of at least 60° with the horizontal. These tanks have the advantage of no moving parts. However, they have the disadvantages of higher headroom and pumping requirements than flat bottom tanks of equal capacity and surface area. In proposed new installations, where the principal objection to hopper bottom tanks is lack of headroom in the mill, consideration should be given to outdoor construction. An illustration of the latter, which is particularly applicable in moderate climates, is depicted in Figure 4. For positive removal of floated solids mechanical skimming devices are required. These recover the solids in a volume small enough to permit direct reuse in the stock preparation system. Skimming is most feasible when applied in conjunction with removal of deposited solids since a single mechanical device can be used for both purposes.

Removal and disposition of floated solids involves, at the very least, a complication of the white water return system, since a separate receiver, pump, and piping are required. The handling of deposited solids involves no such difficulties since the normal white water return facilities are used.

The desirable features, described above, of white water tanks wherein solids segregation is promoted, are illustrated in Figure 5.

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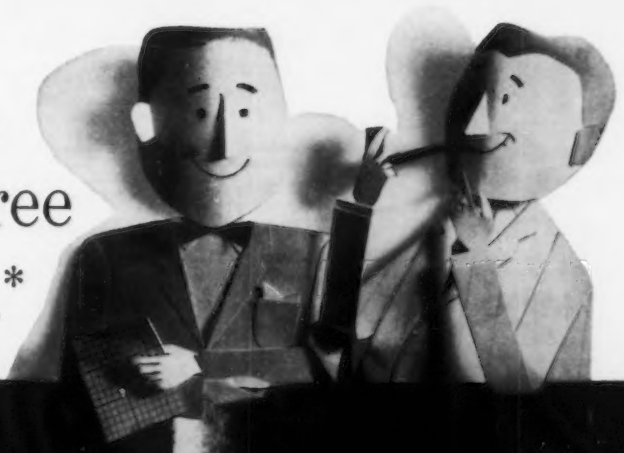

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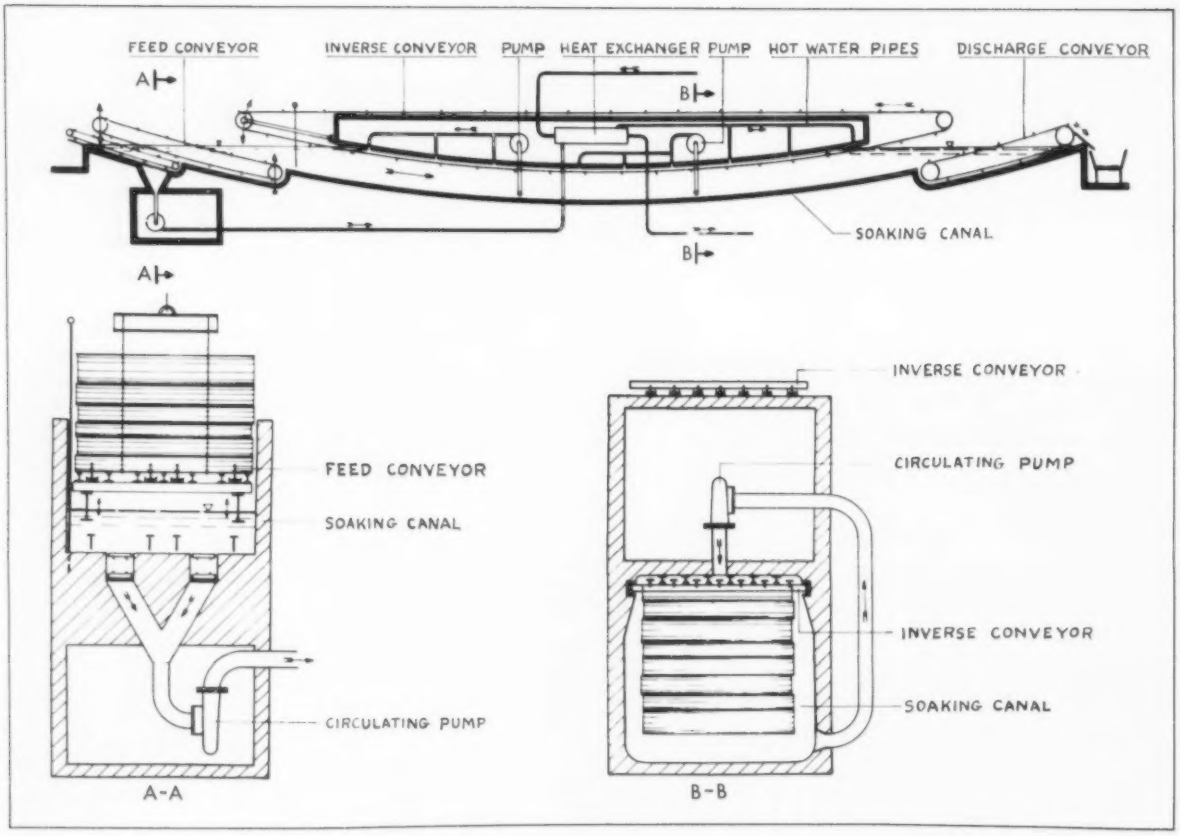

New Device for Soaking Wood before Barking

Bjorn Sucksdorff
Technical Director
Kymmene Aktiebolag
Kuusankoski, Finland

The oldest method of barking is knife barking. The result is clean wood, but the wood losses are high. The newest method is chemical barking. This method is not yet fully developed but seems to present many practical difficulties. By far the most popular methods are to bring logs unbarked to the mills and drum- or steam-bark them there, or first to half-peel them in the woods and then remove the rest of the bark at the point of use. This last method is most important where the wood has to be seasoned for one reason or another.

It is a well-known fact that as long as the wood is green and unfrozen, it is comparatively easy to tear away the outer and inner bark from the soft cambium, particularly in the sapping season. If, however, the logs are allowed to dry with the bark on, it will stick to the wood in a most inconvenient way. The same happens if the logs are allowed to freeze, although to a lesser degree, and the worst condition is when they first dry and then freeze.

It is necessary to rewet the cambium in order to soften it and to warm the resins to replasticize them if one intends to bark dried wood without knives or excessive power-input and wood losses. Unfortunately, dried-on bark makes a very efficient insulating jacket both against the penetration of water and heat to the cambium, but if the wood is half-peeled, it is possible for the water to reach the cambium and soften it. The warmer the soaking water is the quicker a complete softening is achieved.

Dry bark brought to the mill with the wood is easy to burn and has a good heating value. Therefore as much as possible should be removed before wetting, using crude machines such as chainbreakers or cambiobarkers. One pass through such a machine will remove enough bark to facilitate soaking.

Effect of Hot Water

As mentioned above, the temperature of the water is of greatest importance. To evaluate accurately the

effect of heat is very difficult, perhaps impossible, as different woods are likely to react differently. Some tests made with Finnish spruce indicate that the same effect is achieved with water of different temperatures in the following times:

°C.	80	60	40
Time	2 h	4 h	12 h
20		10	4
2 days		2 weeks	2 months

According to Bott[1] the swelling at 100°C. is ten times and at 80°C. five times quicker than at 40°C., but the wood species is not mentioned.

To make the swelling of the cambium possible, heat and moisture are necessary, and either steam or water can be used. Superheated steam may have the opposite effect of drying the wood and is, therefore, not suitable. If saturated steam at atmospheric pressure is used, penetration as the steam condenses on the wood is quick, but enough of it must be used to increase the moisture content of the bark, wood and cambium sufficiently. Water sprays in conjunction with the steam are for this reason recommended. The old theory, that a quick cooling of steamed wood with cold water loosens the bark, has proved wrong. If water is not used, the hot wood evaporates water again very quickly and the swelling effect is thereby lost. The effect of the water is, therefore, only to keep the moisture in the wood. Where steam is used, the condensate is lost for the boiler house.

Hot water does not act so quickly as steam, and a longer soaking time is, therefore, needed, but the same water can be reused and reheated in a heat exchanger and the condensate sent back to the steam plant, or warm water can be used. Which method is most suitable depends on local conditions, but in most instances the scale will drop on the side of hot water heated in heat exchangers with steam. It is obvious that also when water is used for the soaking, the wood must not be allowed to dry before the bark is off.

Hot Ponds

The hot pond is the prototype of device using water. The wood is floated on top of the water, and if many layers of wood are used, hot water sprays must be applied. The water surface must be agitated or other means adopted to stop the floating logs from turning the same side up all the time. This device is usable only for melting ice from wood or washing the surface of it. A hot-pond cannot be used for real soaking of wood, because, if warm water is used, the size will increase beyond practical limits, and if hot water is used, the heat losses from the immense free surface will be very great and the mist most troublesome. An open water basin, into which the logs are fed from one end, pressed below the water and kept there by a continuous mat traveling on the surface of the water and extracted from the free surface of the far end, is an improvement on the hot-pond. Here many layers of logs are traveling through the canal, but if longer pieces of wood are used, clogging results and the steaming from the free water surface puts a limit to the temperature. The canal cannot be closed because clogging has to be cleared from the topside. In the following a device is described by which most of the aforementioned difficulties are overcome.

The Problem at Kymmene

When the Kymmene sulphite pulp mill was rebuilt and its production raised from 180 to 350 metric tons per day, we were faced with the problem of increasing the barking capacity. The mill uses half-peeled seasoned spruce logs of 2-meter length and has three Wilén type barking drums 6-meter diameter and 14 meters long. Two of these drums were enough in summer time, but although warm water was used in them during the winter periods, three drums were not quite

Wood entering the canal, at center right (under steel beams).

Interior of empty canal, upper conveyor drops down.

[1] Rudolf Bott in "Wochenblatt für Papierfabrication" No. 10, May, 1957.

enough. For the doubled production at least three new drums were required, but there was no room for them. It was by trials demonstrated that if wood was soaked in hot water (80°C.) for two hours, the time required in the drums was only one fifth of the usual time in the winter. This on the other hand meant less power and above all less wood losses through broken logs and broomed ends. It was, therefore, decided to construct a soaking device for pre-treating the logs.

New Idea in Cooking

The basic idea of the new device is that a pile of wood is continuously to be fed through a closed hot water canal without altering its shape. To achieve this the two sides of the canal are made vertical, but the top and bottom are parts of concentric cylinders with their axis high up in the air. The drawing shows the construction. The wood is fed in bundles of about 10 cubic meters each by an overhead crane onto a conveyor with downward slope. On this first conveyor a pile is formed, two meters wide and 1.5-2.0 meters high (see picture). The pile travels continuously down into the water and gradually floats up against a second long conveyor running under the roof of the canal. Means were provided to stop the conveyor should the pile by mistake be made so high that jamming between the two conveyors could happen, but since the operators have become accustomed to their job, these are no longer necessary. The speeds of the two conveyors are proportionate to their radii from the cylinder axis and are adjustable.

The second or overhead conveyor carries the pile, which floats up against it, further down into the canal and gradually through it and up again. Figure 3 shows the first canal ready for use. When the pile reaches the free water surface in the discharge end, it collapses upwards and the logs float up on the water. A third conveyor with much higher speed than the two first ones removes the logs from the soaking canal over the endwall.

The water in the canal is recirculated through a heat exchanger and kept at 75°-80°C. temperature. The walls are all insulated and the heat losses therefore small. The free water surface in the feed end is so small that practically no steaming or fogging occurs. At the discharge end the hot wet logs are steaming and cold water is used to cool them. Good ventilation and a hood are required.

It took us one year before all start-up troubles were cured, but since that the canal has been in operation three years. Not once has it been clogged. At the start we found to our surprise that strips of bark were loosened in the water and they sank to the bottom of the canal, and that means for removing it had to be installed. Another, more pleasant surprise was that a big portion of the bark dropped off when the logs fell down a chute onto a conveyor leading to the barkers. The total result was that we are able to make 350 tons a day with the soaking canal and only the two drums.

Two Kinds of Wood

The mill is designed to use two kinds of wood: spruce and birch, simultaneously, and two canals are, therefore, needed. After we had gained experience with the first, the second canal was built. Because the bark came off so easily, it was decided to add a Valmet parallel pocket barker of I.K.R. type to remove the loose bark. The pocket works continuously and the volume is only 10 cubic meters. As 100 cubic meters per hour are fed through it, the average time in the barker is only six minutes. Here again we found that the results were beyond expectations, and that one half of the logs came out fully barked. However, the present hook-up is such that all the logs have to pass through the drums. At present a 25 cubic meter I.K.R. barker is being added to the first canal and the conveyors changed so that the old drums will be left out altogether. The relatively few unacceptable logs will be sorted out on a conveyor and returned to the parallel-barker, but the bulk will go directly to the chipper.

Results Obtained

Our wood is, as mentioned before, half-peeled and contains bark equivalent to about two per cent of the dry weight of the wood. Without soaking, the wood losses in our barking drums in addition to the two per cent removed one to three per cent depending on the season. When the wood is soaked and drummed, wood losses are below 0.5 per cent, but in the parallel I.K.R. barker they are practically nil.

The power required in the I.K.R. barker is only 20 per cent that of the drums, and the logs come out without broomed ends, thus reducing the amount of the saw-dust fraction from the chip screens.

The steam consumption is 100-300 kgs. per ton of unbleached pulp depending on the season. As the drums require 20 tons of water per ton of pulp, and this water in the winter has to be heated 20°C. to melt and soften the bark, it is easy to see that without soaking the heat consumption in the wintertime are perhaps twice as big. How much labor can be saved, entirely depends on local circumstances. In our case the production has been doubled without increasing the number of employees. We are, therefore, satisfied that our new development is in every way economical. The invention has been patented in most of the wood using countries.

"Of course this is just temporary until the new roll trucks arrive!"

Productive Maintenance and Your Electrical System

T. M. Hushen

Manager, Richmond, Virginia Service Shop
General Electric Company

I would like to point up some considerations for the maintenance of important electrical equipment; what part vendors can play in the maintenance program; some recommended tests and tool equipment; and what an unscheduled outage can do to a plant.

Six Considerations

There are six principal considerations when formulating the "Planned Overhaul" of installed equipment:

1—The age of the machine since purchase or latest overhaul.

2—The function and productive importance of the machine. If the machine is in a key position with relation to other operations, compare "Breakdown" cost against "Planned Overhaul" cost.

3—The probable retirement or replacement of the machine.

4—Past experience on similar machines that operate under the same conditions.

5—Consideration of the reconditioning of dependent or secondary equipment at the same time.

6—Attempt to maintain the average age of the machine windings in your plant at some pre-determined number of years. Many companies have allowed this average to become too great, resulting in a radical increase in the frequency of "Breakdown". This, of course, not only increases lost production time, but forces you to overhaul and repair your machines at inconvenient times and premium costs.

Importance of Supplier

All successful maintenance operations require the whole-hearted cooperation of the vendor of the equipment being maintained. Remember, the manufacturer of electrical equipment has a sincere desire to assist with factual information on how to maintain that equipment. It is to his definite advantage to do so for the continuity of service of this equipment will influence your future purchases. To take advantage of his experience, see that:

1—Equipment supplied is designed to require a minimum of maintenance. Where routine maintenance requires the replacement of wearing or burning parts, every effort should be made to influence the manufacturer to design the equipment or device to permit rapid and easy servicing.

2—On either new equipment or old, insist that reliable recommendations be made by the supplies for renewal parts stock.

3—See that data supplied when purchasing equipment is sufficient to insure prompt repairs. Request the equipment manufacturer to provide bulletins or catalogs to be used in the event of the failure of a machine or device. This information will also help maintenance man select the proper repair parts from stock.

4—Ask the supplier to help establish a "Planned Overhaul" program. The manufacturer of the equipment will work with you to establish a good program of machine overhaul, repair and modernization. He understands the equipment and is in a position to furnish valuable knowledge.

Effect of Unscheduled Outage

In speaking of an unscheduled outage and its results on production, I have tried to pick a typical example in the industry you represent. I have had to make several assumptions, but believe the following will present a fair cross-section:

Medium size mill — approximately 800 ton.

Gross Product—$26,000,000/year or $3000/hour.

Let us consider the case of the induced draft fan on one of your recovery boilers:

500 h.p. motor
600 r.p.m.
2300 Volts

A failure of this motor will reduce the output of the mill 50%.

Assumption One–)spare motor in stock)cost–$10,000.

Time required for change-over—4 hours Cost $6,000 (50% drop in production)

Total—$16,000 and cost of rewind on straight time basis.

Assumption Two–)spare motor–350 h.p.)pro-rated cost–$1500

This motor is used as a spare for several operations.

Time required for changeover—4 hours Cost $6,000 in production

With this motor in service, the plant can operate at 85% capacity. Assuming it takes 5 days to rewind the motor and return it to service, the loss in gross product will be —$54,000.

This figure has to be added to the above $6,000 plus the overtime repair costs of the motor, for total cost.

Assumption Three–No spare available.

Time required to rewind motor and return to service—5 days.

Loss in gross product—$180,000.

This figure plus overtime repair of the motor will give total cost.

The above examples can be carried further to what a loss in production will mean to expected return on investment and what its effect will be on operating income.

In addition you must also consider the effect of extended deliveries to your customers.

In reviewing the above examples, the obvious choice appears to be the stocking of a spare 500 h.p. motor. How-

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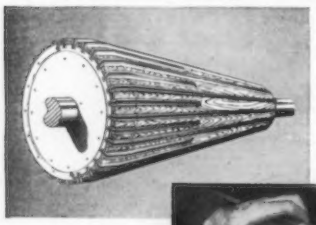

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ever, the smaller motor may offer such a degree of adaptability of versatility that from an overall plant standpoint, this is the choice.

You can work up similar cases for the other important equipment in your mill such as jordan drives, M-G sets, etc. By so doing, you will have an excellent picture of your requirements and will be able to keep down time due to unscheduled outages to a minimum. One word of caution, although I am sure it is not necessary; if you plan for every eventuality, you will soon price yourself out of business.

Importance of Inspection

One of the most important steps in a good maintenance program is regular inspection of the apparatus.

I would like to stress a point at this time. By regular inspection, I mean regular electrical inspection as well as regular mechanical inspection. Too often regular inspection of large important apparatus, such as turbine generators, motor driven fans and compressors has only meant mechanical inspection with hardly a glance at the electrical end. Remember, that a turbine cannot generate electricity by itself and that a compressor is useless without a driver. It is equally as important to inspect the electrical end of this equipment with the same thoroughness accorded the mechanical end.

There are several tests that can be made while equipment is out for inspection. I would like to briefly comment on a few:

Insulation Resistance Test

This test is valuable in determining the degree of moisture present in a winding and also give some indication as to the cleanliness of the machine. Insulation resistance readings on low voltage machines will indicate whether or not the machine is capable of withstanding a potential equal to that supplied by the test equipment and gives an indication of the d-c resistance of the insulation. It does not give you complete assurance that the machine can be returned to service. It is not uncommon for dry brittle windings, which are relatively free from dirt and moisture, to show very high insulation resistance readings, yet the windings may be at the point of failure due to cracks and voids in the insulation. Insulating resistance readings, however, should be taken on all windings before a hi-pot test is applied and if moisture is present, the machine should be dried out before hi-potting.

Polarization Index Number

This is simply a ratio of the insulation resistance at the end of ten minutes. A P. I. number approaching one to one and one-half would indicate the winding should be dried out before placing back in service. Clean, dry windings should show a P. I. number of approximately 2½ to 3.

D. C. Dielectric Absorption Tests

This test, which is a variable d.c. voltage test is being widely used by industry and gives an indication of the dryness of windings in addition to an indication as to the resistance of surface leakage paths. This test has value when made periodically and comparing the leakage current from one test to another. These tests are generally repeated every 12 to 18 months and with the information obtained predictions are made as to when a unit should be taken out of service for—

1—cleaning
2—cleaning and painting
3—repair
4—rewind

Many mills have already started this program with turbines generators and larger motors and generators.

In regard to routine maintenance, I am listing below several things which should be considered in the daily tasks of maintenance men:

1—Vibration—any change or any increase should be investigated.
2—Brush wear, brush performance.
3—Commutator and collector ring performance.
4—Temperature rise (stator and bearings).
5—Change in noise level.

With an established program, excessive maintenance on any piece of equipment will readily become obvious. When this happens an investigation can be made into the cause:

1—Is this the right size.
2—Is the equipment operating on an intermittent load and designed for constant load.
3—Is an open motor being used where a closed motor is required.

Conclusion

In conclusion, it is well to keep abreast of advancements and improvements in the maintenance field. New techniques are constantly being developed to improve rewinding methods; new insulations which can materially help your operation are being discovered. The epoxy resins are coming into their own in a number of applications.

By watching these trends and by faithfully following your established maintenance program, you will, as time goes by, receive a greater and greater return on every dollar invested in maintenance.

Presented at the March 14, 1958 Meeting of the Virginia-Carolina Section of TAPPI.

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Groundwood Fraction Mixing Process

Control of pulp quality or manufacture of several grades simultaneously may be done by screening into separate components and reblending in varying proportions

Dr. K. H. Klemm
Manager, München Dachauer Papier Fabriken
Munich. Germany

English text by
G. P. Chinn

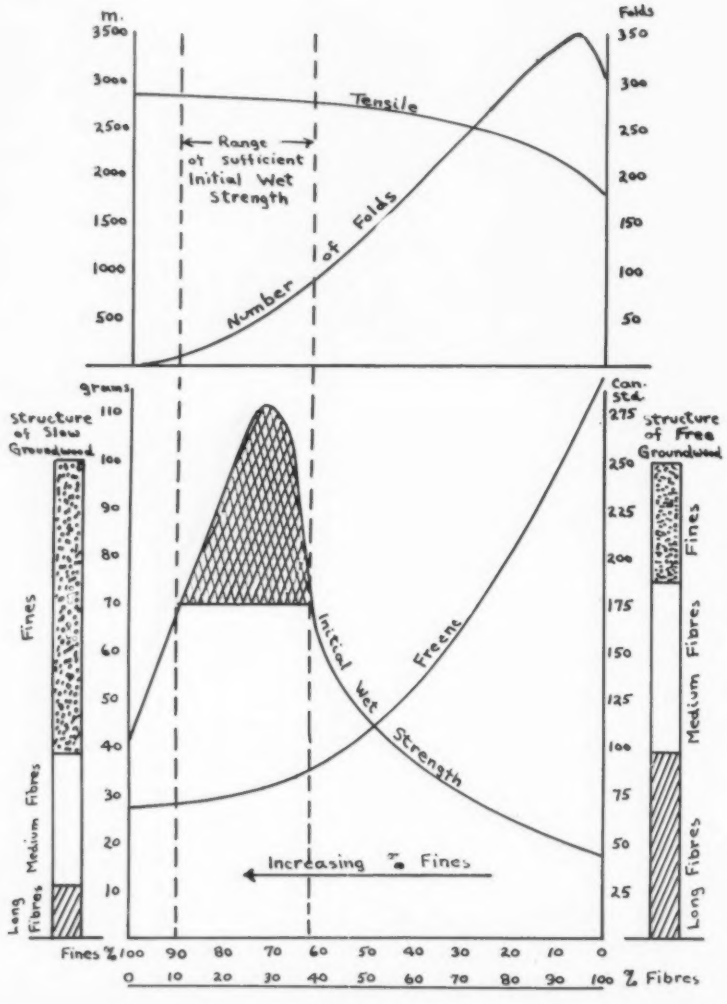

FIGURE 1—Groundwood quality ranges possible with the various stock mixtures by using groundwood fraction mixing process (example).

Recent efforts towards attaining more uniform groundwood quality have chiefly been centered around improved quality control at the individual grinders and better mixing of the composite stock. An entirely new solution to this problem has been offered by the "Groundwood Fraction Mixing Process." *(1)* With this, the idea is to separate the groundwood by special screening into two components of very different composition. Then, by the controlled mixing of these components in the required ratio, the desired quality can be achieved. As will be shown later, this new process can be used for the control of the whole grinding operation.

With this new method, the groundwood is not used with the random fibers classification which is formed at the grinder, but, as a controlled mixture which can be changed at any time to give a stock having the properties required for paper making. Despite changes in paper grades or machine conditions, the paper machine can be immediately supplied with groundwood having the desired properties. To compensate for the differences between the rates at which the fiber fractions are produced and consumed, storage tanks are provided for each of them. The relative levels in these storage tanks are then used to control the grinder operation so that, over a longer period, a complete balance between production and consumption can be maintained.

Separating Two Components

The process is based on the experience which has shown that quality fluctuations of the groundwood during production are chiefly related to a changing of the ratio between fibers and fines. Therefore it must be possible to change these variations from "quality"

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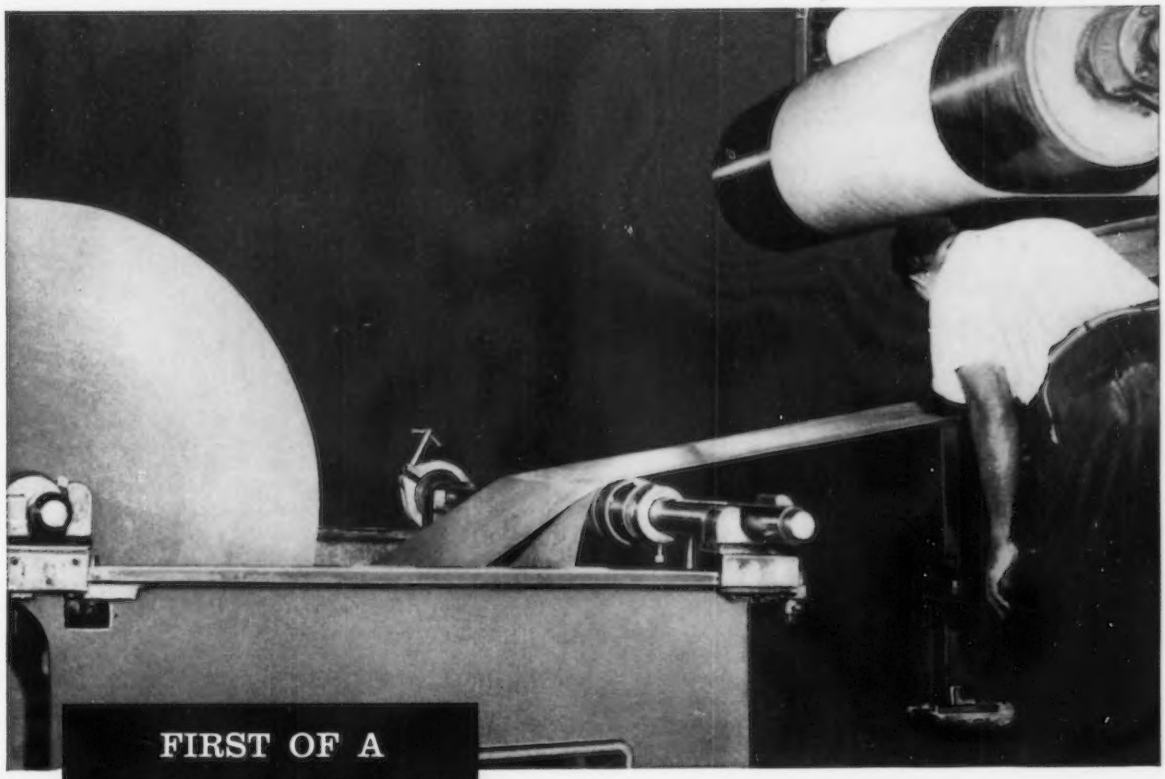

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into "quantity" by separating these two components. Trials using the "Groundwood Fraction Mixing Process" have shown that it is not necessary to make a complete separation (which would be difficult) but that it is sufficient to divide, by special screening, the groundwood coming from the grinder room into two components, the composition of which is as different as possible. This is easily done in a two stage screening system in which plates with fine perforations are used in the first stage and relatively coarse perforations in the second. This is opposite to normal practice. Such a screening system must not only perform the usual task of separating the good fibers from slivers but must also separate the former into two fractions having distinctly different properties. Thus for subsequent blending, two components are available; the one being relatively slow and the other relatively free.

Mill trials have shown that different mixtures of these two stocks can result in groundwoods covering a relatively large quality range. Figure 1 shows the results obtained during a mill trial using this type of screening system and the range of groundwood quality which can be achieved. During these trials, by correct blending of the two components, it was possible to manufacture both newsprint and finer grade papers without otherwise changing the furnish and still maintain a satisfactory quality.

Method of Blending Fractions

When using this process, the blending of the two fractions can be done in different ways. For continuous operation in integrated groundwood and paper mills, the system indicated in Figure 2 is recommended. The greater portion of both partial streams are mixed for direct use in the paper mill and only the surplus of each stream is fed to its storage tank. If production of these two fractions gets out of balance, the correct proportion is automatically maintained in the mixture by the surplus or deficient fraction being added to, or drawn from, the appropriate storage tank.

Automatic Control

A particular advantage of this process is that there is an automatic control of groundwood quality according to the requirements of the paper mill. The quality of groundwood delivered to individual paper machines can be changed instantly, i.e. with change of grade of paper, while (because of the buffering effect of the storage tanks) the quality adjustments in the grinder room need only follow more slowly. Control of both groundwood quality

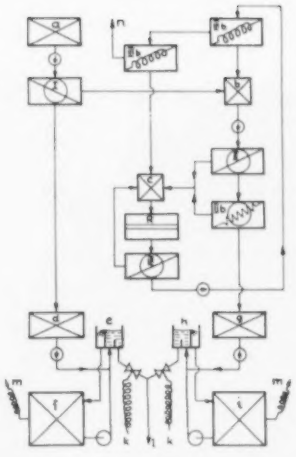

FIGURE 2 — SCREENING LAYOUT FOR "GROUNDWOOD FRACTION MIXING PROCESS": a—Chest for accepted stock from bull screens; b—Chest for rejected stock from fine screen, primary stage; c—Coarse stock chest; d—Thickener and thick stock chest for "fine" fraction; e—Stuffbox for "fine" fraction; f—Storage chest for "fine" fraction; g—Thickener and thick stock chest for "fiber" fraction; h—Stuffbox for "fiber" fraction; i—Storage chest for "fiber" fraction; k—Remote controlled proportioning valve for setting stock quality required by the paper mill; l—Proportioned stock to the machine chest; m—Storage tank level indicators, in the groundwood mill; n—Rejected stock from the secondary vortex screening stage to sewer.

and production is achieved by following the levels in the two storage tanks. For example, if the level in the "slow" tank increases, the grinder operation must be adjusted in order to produce a slightly more free stock, and vice versa. In addition, with regard to the trend towards greater automation in paper production, this process provides the possibility of automatic control of stock composition from the paper machine. While practical experience with the groundwood fraction mixing process is still limited, from the possibilities it holds for a systematic build-up of the groundwood stock composition and for a reduction of groundwood quality fluctuations, real advantages in the field of paper production can be expected.

Bibliography

(1) Brecht, W. Developments. *Das Papier* 2, No. 23/24; 437 (1948).

(2) Klemm, K. H. German Patent 18,536 (1948). British Patent 21,737 (1949).

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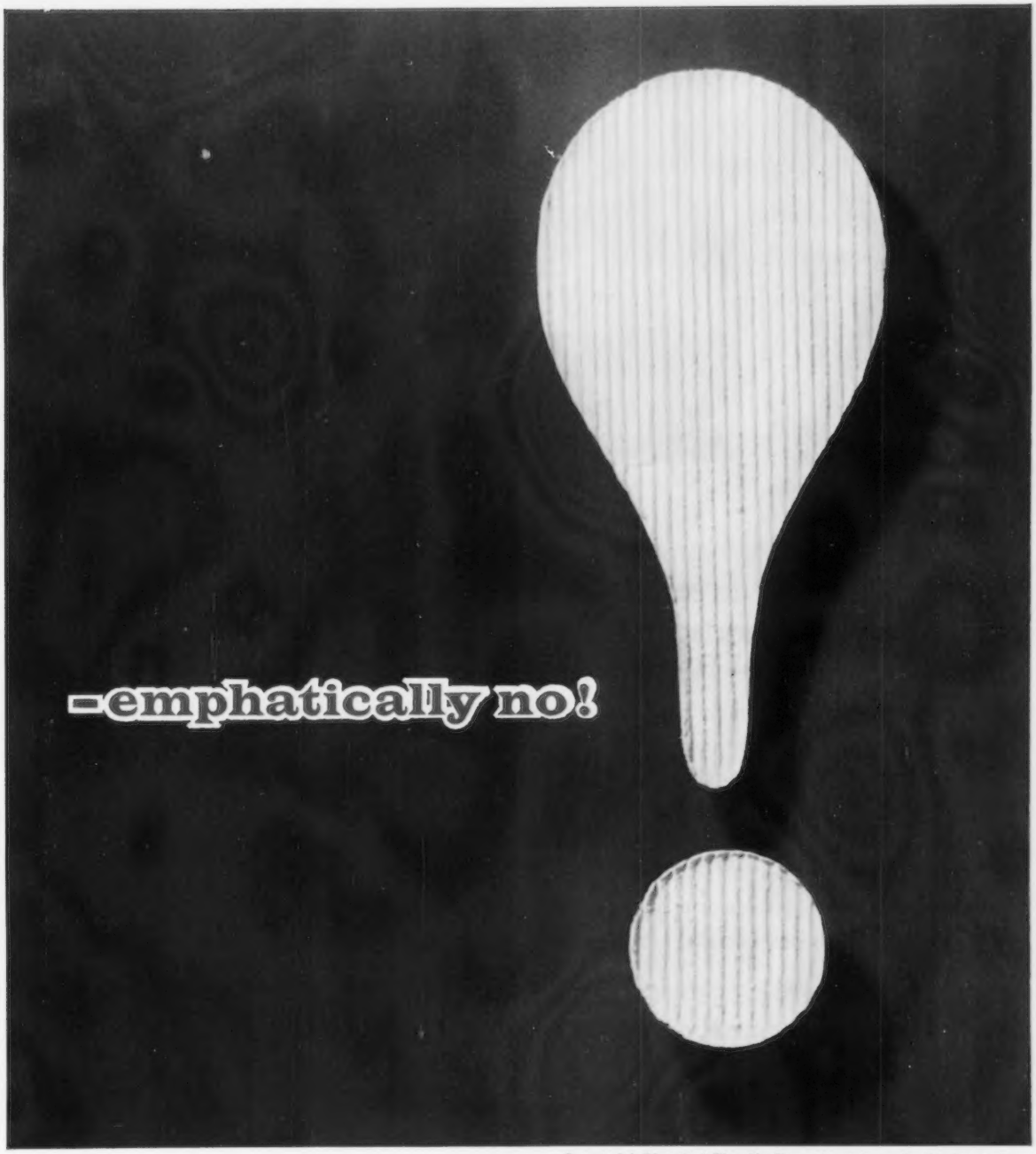

Brunswick Bleached Pine Kraft was used to make this illustration

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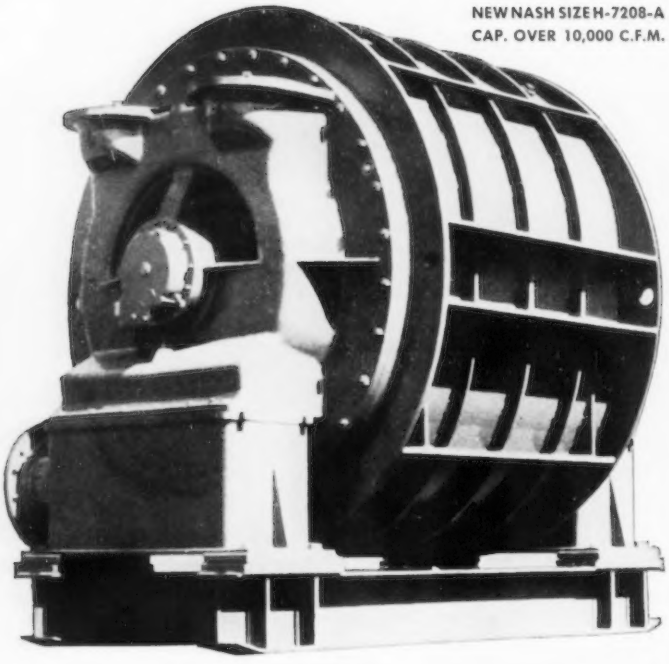

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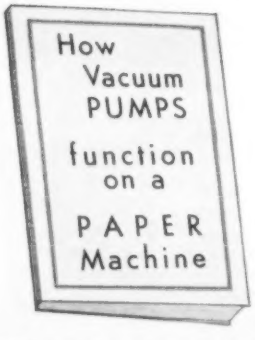

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drums, l.c.l., wks.	cwt.	9.50	/10.50
Sodium peroxide:			
dms., c.l. E. of Miss.	lb.	.20½	/ —
l.c.l. (same basis)		.21	/ .21½
Sodium silicate, 40° Be.:			
tank-cars, wks.	cwt.	1.20	/ —
drums, c.l. wks.	cwt.	1.55	/ —
47° Be. WW.			
tank-cars, c.l. wks.	cwt.	1.90	/ —
drums, c.l. wks.	cwt.	2.25	/ —
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Starches:			
Corn, multiwalls, c.l. prod. plant:			
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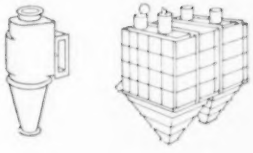

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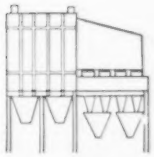

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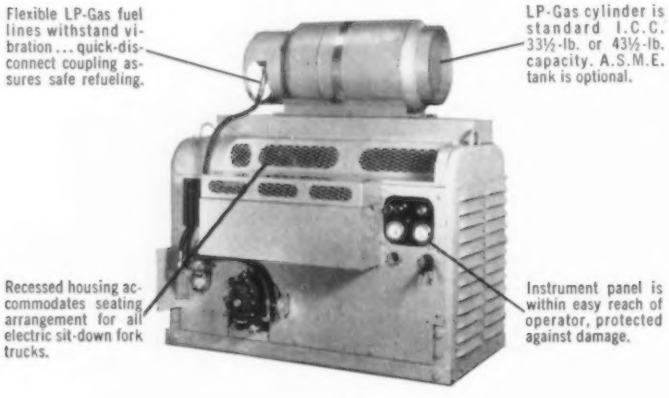
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Penn Card & Paper Co. Inc. has moved its offices and warehouse to York & Gaul Sts., Philadelphia 25, Pa. The new telephone number is GArfield 5-5200. A railroad siding running into the building can accommodate freight cars up to 40 ft. in length and 14 ft. 2 in. in height.

Bulkley Dept. Transferred to Carter-Rice

The merchandising department of Bulkley Dunton & Co. Inc., New York and Newark, has been transferred to its wholly-owned subsidiary, Carter Rice Storrs & Bement Inc. The new operating name is Bulkley Dunton & Co., Div. Carter Rice Storrs & Bement Inc.

The new corporate title in no way effects our existing facilities, merchandising policies or distribution of paper.

OBITUARIES

Robert Lindsay Challoner, 59, died at his home in Victoria, B.C., March 25 after a brief illness. He had been president and manager of Victoria Box and Paper Ltd. until his retirement in 1957. He founded the firm in 1926 with the reorganization of Davis and Schmelk into Victoria Box Co. which in 1934 took its present name.

LeRoy Shipman, 77, retired assistant sales manager of Mersey Paper Co. Ltd., died March 26 at his home in Moncton, N.B. He joined the Mersey Co. in 1930 and retired two years ago.

Robert F. Graham, 58, treasurer and general manager of the Graham Corp. and the Lawrence Waste Paper Co., died March 21 at St. Elizabeth's Hospital, Brighton, Mass. after a long illness.

Henry L. Adler 62, president of Huff Paper Co., Philadelphia, died April 2. Mr. Adler was a former president of the Philadelphia Paper Trade Association.

William B. Hunter, who owned and operated W. B. Hunter Fine Papers Co., Chicago, died March 21 in Clearwater, Fla., where he had spent the winters for the past 12 years.

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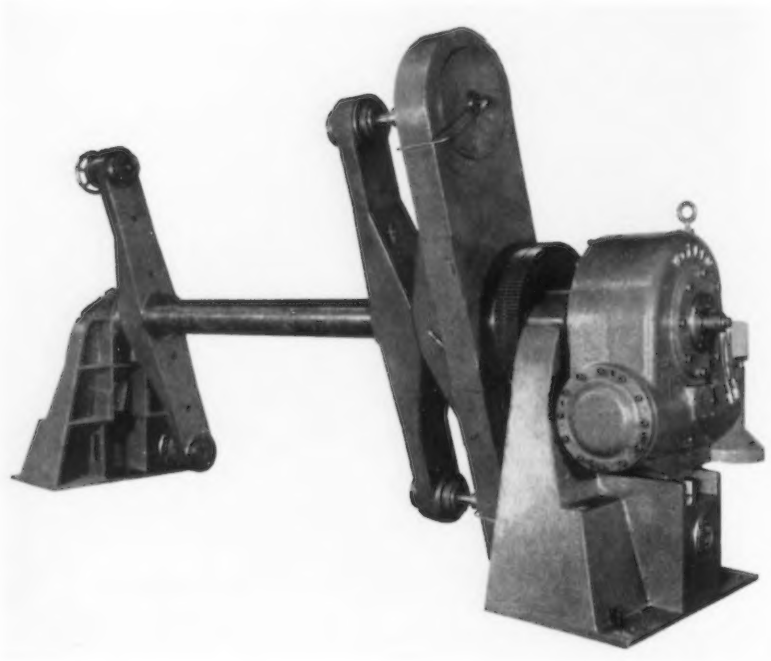

New Large Capacity Reels

Black-Clawson Co., Dilts Division at Fulton, New York, has introduced a new line of Model 52 two-arm rotatable unwind and winding reels, capable of handling large diameter rolls weighing up to five tons. Standard units are available in five sizes to handle roll diameters of 42, 48, 60, 72 and 84 inches. Both the unwind and winding units can be set for either shafted or shaftless operation at speeds in excess of 1000 f.p.m. The integral worm gear box is torque-arm mounted to ride with the main shaft. It will handle up to 350,000 inch pounds of torque.

High Capacity Screening In Cramped Quarters...

Developed jointly by Bird Machine Co. and Canadian Ingersoll-Rand Co., the new Bird Centriscreen occupies 22 sq. ft. of floor space and provides 30 sq. ft. of screening surface.

The screen plates are stainless steel, rigidly supported, stationary concentric cylinders two and three feet in diameter. Stock enters under pressure, tangentially through a 14-inch inlet designed to trap heavy objects. It then flows to the compartment between the screen cylinders, passes through the screen plates, and flows out a 14 inch outlet. Screen surfaces are kept clean by double hydrofoils operating at 300 r.p.m. Rejected shives and dirt particles flow downward between the screen cylinders and are collected being removed through a four inch tailings outlet. Effluent from the tailings outlet is reported to contain almost no good fibers. The screens are available from Bird Machine Co., South Walpole, Mass.

Flowmeter Line Enlarged

Seico Instrument Div., Eclipse Fuel Engineering Co., Rockford, Ill., has recently enlarged and improved its line of indicating flowmeters for air, gases, and liquids.

Standard liquid flow instruments are now available with aluminum and brass bodies for pressures up to 2000 p.s.i.g., and with special body materials for corrosive applications. Scale ranges run from (0 to 0.1 g.p.m.) up to 0 to 6000 g.p.h. For scale ranges up to 20 g.p.m., meters are available for direct installation in the flow lines. For larger scale ranges, shunt arrangements are used. All instruments are furnished complete ready to connect into the flow piping.

Series 1050 gas flow models are now available with scale ranges from 0 to 30 cfh (0 to 0.5 cfm) up to 2400 to 60000 cfh. For scale ranges up to 50 cfm, meters are installed directly in flow lines. For larger ranges shunt arrangements are used.

Hollowshaft Worm Motoreducer

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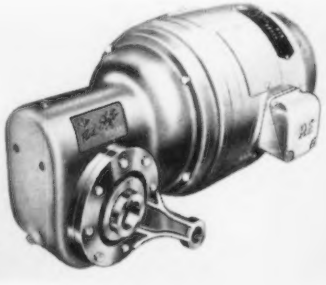

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The troughs are available in all standard screw trough sizes from 6 to 24 inches diameter in standard 10 foot lengths. Special shorter or longer lengths will be made to order. Various metal combinations are available—stainless steel jacket and trough, carbon steel jacket and trough or stainless trough with carbon steel jacket. Other metals such as monel, nickel and inconel can be furnished.

Due to their ribbed and panel welded construction, safe working pressures of up to 100 lb/sq. in. steam or water are possible without expensive heavy construction.

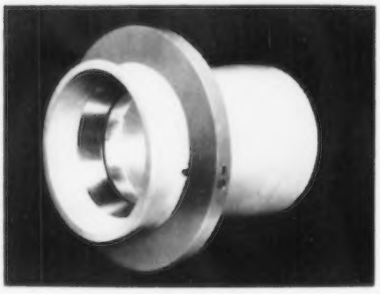
The troughs are made by M-H Standard Corp., 517 Communipaw Ave., Jersey City, N. J.

Ceramic Magnet Pulley Said to Equal Electro Types

Index V ceramic permanent magnets energize a new pulley, producing a powerful magnetic field that is reported to effectively remove troublesome tramp iron from fast-moving conveyor burdens. The new permanent magnet pulley is said to equal the performance of electromagnetic types, and is far superior to conventional permanent magnet models.

The secret of the pulley's performance is the radical pole design of the magnet assembly which boosts holding efficiency without the disadvantages of electrical power supply.

Series "410" Permanent Magnet Pulleys, and the Series "710", for deeper conveyor burdens, are available in standard widths from 12 inches up in diameters of 12, 15, 18, 20 and 24 inches from Stearns Magnetic Products, 635 South 28th St., Milwaukee, Wis.



Plastic Flow Tube

A compact, plastic, insert-type flow tube has been announced by Builders-Providence, Inc., a division of B-I-F Industries, Inc., 345 Harris Ave., Providence, R. I. It is made of epoxy or polyester resins, reinforced with fiberglas, with a corrosion-resistant metallic throat-ring and flange. This flexible differential producer is suited for metering ordinary liquids, gases, acids, alkalies, and slurries, with low head loss. Accuracy is within 1 per cent of actual flow rate for uncalibrated units, and can be increased to with .5 per cent by laboratory calibration. Standard models are available with a variety of metallic materials, and for pH from 0.2 to 10. Temperature ranges are from –60 deg. to 220 deg. Fahrenheit.

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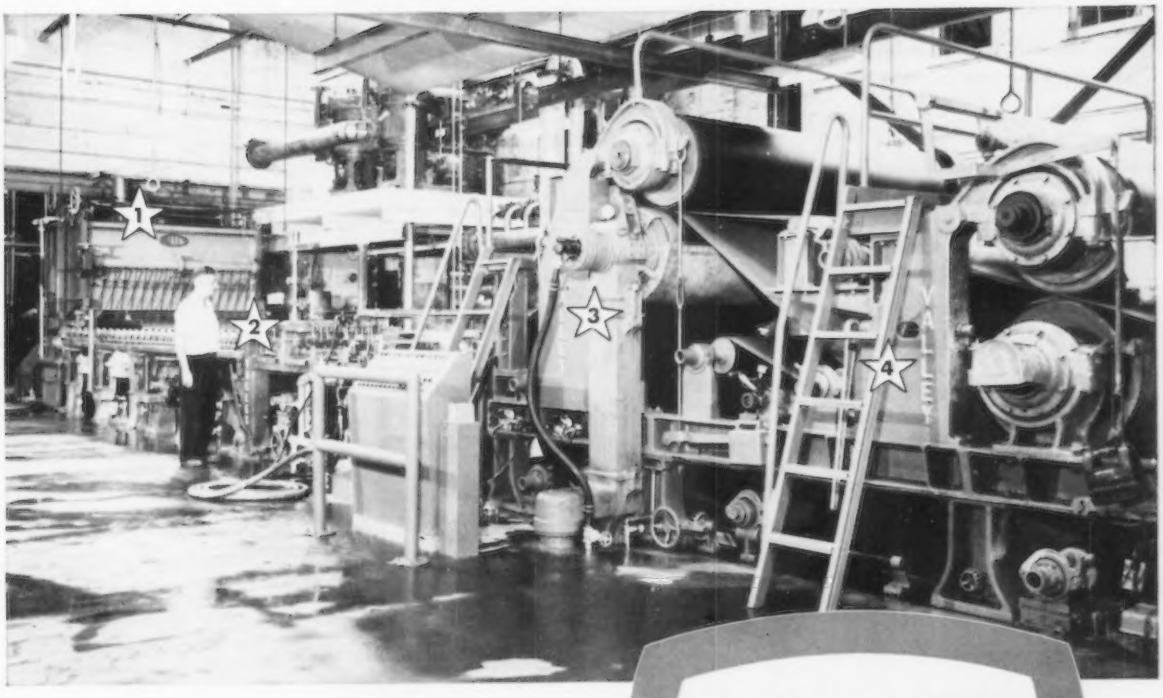
Nekoosa No. 3 REBUILD



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1. **NEW** Inlet and Head Box
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Following the complete rebuild of the wet end of No. 3 machine at the Nekoosa mill of Nekoosa-Edwards Paper Company, company officials report extremely satisfactory performance and that the machine is producing a sheet with good characteristics.

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	U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$82.50/ 90.00	$82.50/ 90.00	‡$90.00/ —	‡$90.00/ —	‡$90.00/ —
Bleached Gw'd.	$97.50/100.00	$97.50/100.00			
Kraft, Blchd.	157.00/ —	160.00/162.50	$157.00/162.50*		$157.50/ —
Kraft, Blchd. Hdwd.	152.00/ —		$137.00/ —		
Kraft, Semi-bleached	140.00/ —	140.00/ —			
Kraft, Unbl.	117.50/125.00	125.00/130.00	†125.00/130.00	125.00/ —	
Sulphite, Blchd. ...	155.00/ —	155.00/ —	*155.00/ —	*155.00/ —	155.00/ —
Sulphite Bl. Hdwd.	150.00/ —				
Sulphite, Unblchd. .	135.00/ —	135.00/ —	†135.00/ —	*130.00/ —	
Sulphite, Unb'l. Gl'sn		134.00/ —	†134.00/ —		
Soda, Blchd.	147.00/150.00	150.00/ —			

‡ On Dock Atlantic Ports. * Freight allowed. † Varying Freight Allowances

NEW YORK RAG MARKET

PRICES NOMINAL

New Domestic Cotton Cuttings

Delivered Mill Basis

	Per 100 lbs.
No. 1 White Shirts	$12.75/$14.50
No. 1 Unblchd. Muslins	16.00/ 17.00
Blchd. & Unblchd. Underwears	15.00/ 16.00
No. 1 Light Silesias	6.00/ 7.00
No. 1 Light Blue Overalls	6.00/ 7.50
Percales	6.00/ 6.50
No. 1 Light Prints	5.00/ 5.50
Suntan Khakis	5.75/ 6.75
Cottonades	3.00/ 3.50
No. 1 Washables	2.50/ 3.25

Old Domestic Cotton Rags

Delivered Mill Basis

	Per 100 lbs.
Mixed White	$3.25/$3.75
Cotton Pants & Overalls	2.25/ 2.75
Twos and Blues, Repacked	2.00/ 2.50
No. 2 Roofing	.60/ .75

COTTON LINTERS

Memphis Market

f.o.b. Oilmills

Week Ended April 4	Per 100 lbs.
Grade 1} n. a.	
2}	
3}	$9.75/ $8.50
4}	8.00/ 7.50
5} 1 cut—felting	7.00/ 6.00
6}	5.50/ 5.00
7}	5.00/ 4.50

*Based on 73% cellulose.

Old Rope & Bagging

(Prices to Dealers, f.o.b. N.Y.)

	Per 100 lbs.
New Burlap Cuts	$4.50/$5.50
Scrap Burlap	3.50/ 4.25
Australian Wool Pouches	5.00/ 5.50
Gunny	4.50/ 5.00
No. 1 Domestic Manila Rope	6.25/ 7.50
No. 1 Foreign Manila Rope	5.25/ 6.25
Domestic Sisal Strings	4.00/ 4.50

WASTE PAPER MARKET

Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	April 7	April 7	April 7	April 7
No. 1 Mixed Paper	$5.00/ $7.00	5.00/ 7.00	4.00/ —	12.00/ —
No. 1 News	13.00/ 14.00	14.00/ —	14.00/ —	12.00/ —
Overissue News (Lg. size)	13.00/ 16.00	11.00/ 14.00	19.00/ —	16.00/ —
Mill Wrappers	11.00/ 13.00	12.00/ 14.00	7.00/ —	13.00/ —
Old Corrugated Containers	21.00/ 22.00	20.50/ 21.00	19.00/ —	20.00/ —
Super Resorted Kraft Paper ...	30.00/ 35.00	35.00/ 45.00	35.00/ —	45.00/ —
New Double Kr. Ld. Corr. Cuts	25.00/ 30.00	30.00/ 32.50	32.50/ —	30.00/ —
(Semi-chem. medium)	40.00/ 45.00	37.50/ 45.00	40.00/ 45.00	35.00/ 45.00
New 100% Kraft Corr. Cuts ...	50.00/ 55.00	50.00/ 55.00	55.00/ —	45.00/ —
New Br. Kraft, Env. Cuts	65.00/ 70.00	70.00/ 75.00	55.00/ —	50.00/ 55.00
New Br. Kr. Bag Waste Prntd.	55.00/ 60.00	55.00/ 60.00	50.00/ —	45.00/ 50.00
New Br. Kr. Bag Waste Unprintd	60.00/ 65.00	65.00/ 75.00	65.00/ —	45.00/ 50.00
No. 1 Groundwood Shvs.	23.00/ 27.00	24.00/ 30.00	14.00/ —	25.00/ 30.00
White Newsblanks	47.00/ 52.50	45.00/ 53.00	35.00/ —	55.00/ —
No. 1 Soft White Shvs.	55.00/ 60.00	60.00/ 65.00	55.00/ —	— / —
Super Soft White Shvs.	65.00/ 75.00	75.00/ 85.00	65.00/ —	— / —
Hd. White Shvs.	90.00/ 95.00	100.00/110.00	90.00/ —	85.00/ 90.00
Hd. White Env. Cuts	115.00/120.00	118.00/125.00	100.00/ —	100.00/110.00
Col. Tab. Cards	50.00/ 55.00	55.00/ 60.00	47.50/ —	37.50/ —
Manila Tab. Cards	60.00/ 70.00	70.00/ 75.00	65.00/ —	75.00/ —
No. 1 Col. Ledger	28.00/ 30.00	30.00/ 35.00	40.00/ —	20.00/ —
White Ledger	42.50/ 50.00	45.00/ 50.00	52.50/ —	35.00/ —
Mixed Book & Mag.†	15.00/ 18.00	17.00/ 19.00	12.00/ —	— / —
No. 1 Books‡	19.00/ 23.00	20.00/ 22.00	27.50/ —	— / —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.

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The most indispensable press in flexographic printing today

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It prints detailed screen or line work on s-t-r-e-t-c-h-y paper, film and foil packaging materials in accurate hairline color register through all running speeds.

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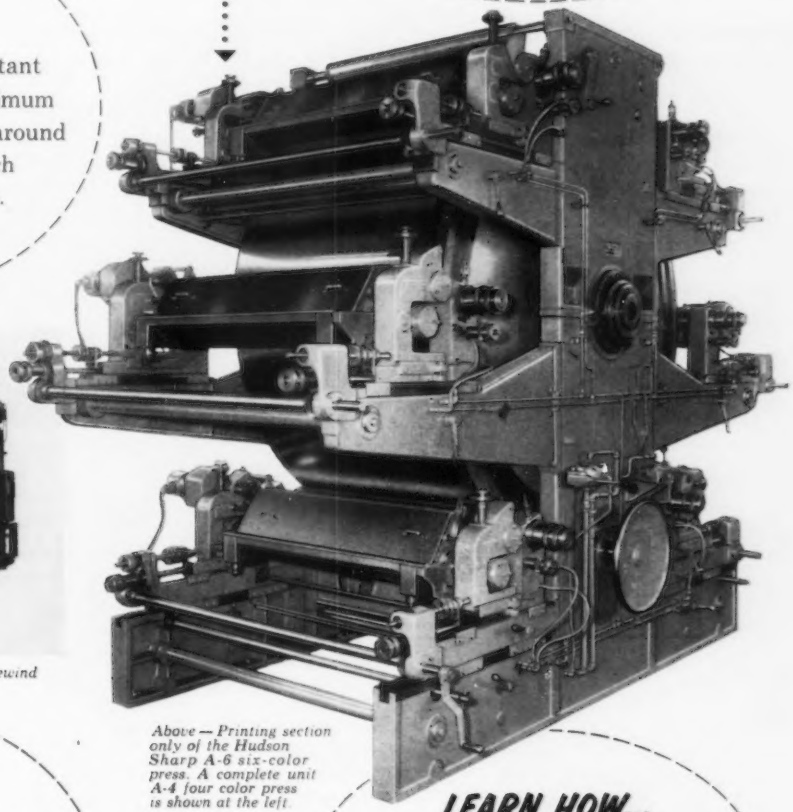
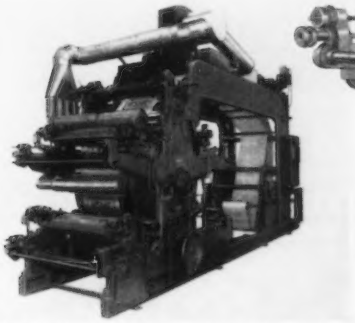
It holds print repeats in constant roll to roll register with minimum variation... HOW web locks around cylinder and cannot stretch or contract between colors.





4-color press with dryers and unwind-rewind

Above — Printing section only of the Hudson Sharp A-6 six-color press. A complete unit A-4 four color press is shown at the left.

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Its exclusive features make it the most efficient, easiest to operate press in flexographic history... HOW its heavy duty construction assures years of trouble-free, smooth vibrationless operation.

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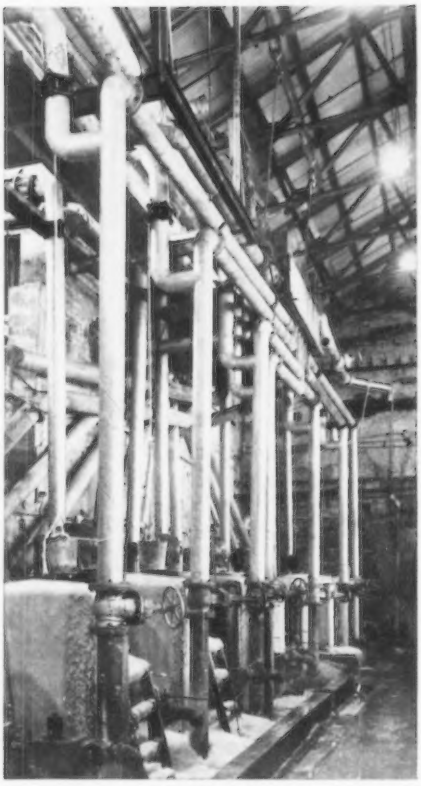

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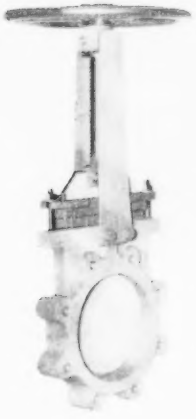

FIG. 45
FABRI-CAST
WAFER
STOCK
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FIG. 42
PLASTIC
STOCK VALVE

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measure its
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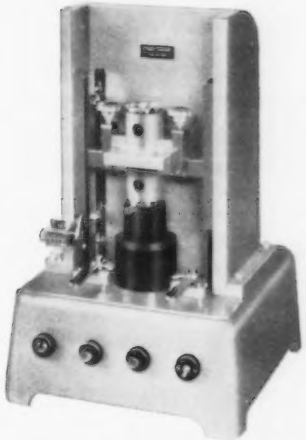
with the

frag-tester



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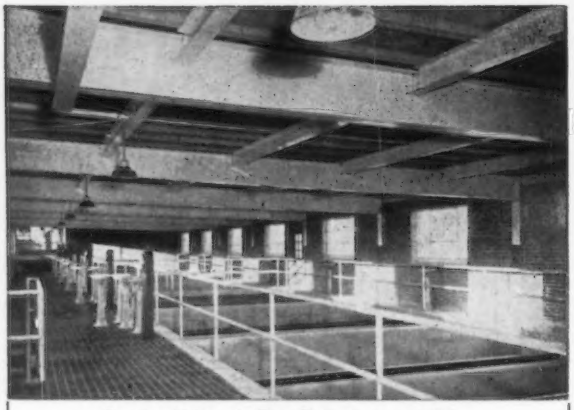

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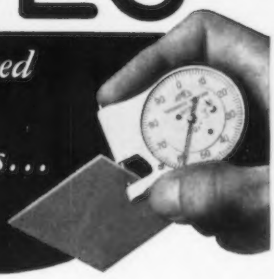

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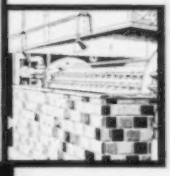

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A-28

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A-21

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1—31" two color Wolverine Flexo-Printer
1—30" 4 Color Kidder Flexographic Press
1—30" Kidder 6 station Flexographic press
1—26" 4 color Kidder Flexographic.
1—25" 8-Color Flexographic Press.
1—24" 4-color Kohlbach Flexographic
1—24" 4-Color Kidder Celloprinter
1—20" 4 Color "Cohma" Shirt Band Press (Roll to Sheet)

TAILPRINTERS

1—32" 2-color 8 pitch.
1—30" 2-color Dietz 10 Pitch.
1—16" 2-color Potdevin 8 Pitch.

POWER PAPER CUTTERS

Seybolds: 94" Auto Spacer with air table, & Warner Elec. Drive; 41" Seybold Saber; 56" & 64" Precision: 50", 56" & 65"—10Z; 60"-20th Century; 35" and 84" Dayton, 6Z 65" Holyoke, Sheridan: 36" new model, Oswego: 44", 38", & 34", 54" heavy duty.

CAMACHINES

1—82" Model 10-10A
1—72"—10-04 Shear Cut
1—72"—10-5 with water cooled brake
1—62" 26-2A
1—62" 26-3A.
1—60" 40-1-AF.
1—52", & 1—42", Model 24-7.
2—52" Type 9-5
1—50" 26-3A with C.T. & Elec. Eye
1—42" Type 9-5-A Roller Bearing 1500 fpm.
1—42" Type 24-2A
1—42" Model 10-5
1—30", 1—42", 1—62" Type 6

OTHER SLITTERS

1—40" Model B Fales Shear Cut
2—24", 1—30", 1—36" & 1—40" Kidder S.L. Shear cut

MISCELLANEOUS MACHINES

1—52" Parry Liner with Reeves Drive.
1—72" & 1—84" Potdevin squeeze roll waxing mach.
1—68" Shartle & Bevis Waxing machine
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1—24" & 1—46" Waldron Reverse Coater.
1—19"—3-Color Printer-Waxer for Bread wrap.
1—Knowlton & 1—Langston Tube Winder with Recutter
1—Webendorfer Automatic collating Machine, Model CS-F
1—McKeage Facial Tissue Machine
2—81" Dietz Facial Toilet Tissue Rewinders.
1—81" Hudson Sharp Toilet Converter for both toilet & towels
3—Hamblet Sheeters, 42", 84" & 100"
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1—2 Web, 1—3 Web Paper Converting Co.'s. Jr. Dispenser Napkin Machines
1—Potdevin Garment Bag Machine, Model 224, Ser. #388. Size 5456-302.
1—Roto Model C Cellophane Bag machine
1—48" Hudson Sharp Embosser-tinter.
1—48" Unicraft Embosser
3—Waldron Embossers; 1—22", 1—46" & 1—60" (latter two heavy duty) A-14

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2—1500 lb. rag beaters, Valley Iron, bandless rolls, 54" x 48", cast iron tubs.

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1—3 roll 30" face friction Calender Stack (Holyoke), 2 iron rolls, 1 cotton roll and 1 spare cotton roll.
1—3 roll 84" calender stack.
1—4 roll 72" Calender Stack. (Extra heavy duty).
1—5 roll 82" face.
1—5 roll 86".
1—7 roll, 84" face.

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1—96" Murray 4 knife Chipper—anti-friction bearings.
1—84" 10 knife Carthage Chipper. Anti-friction bearings.
24—Chipper Knives 15⅛ x 8¼, 2 slot.

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1—Dilts Classifiner, practically new.

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1—Murray Chip Crusher.
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1—Shartle 8" disintegrator with 125 horsepower induction motor. (Totally enclosed).

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2—Waterbury Hydraulic Variable speed line shaft drives (from 40 to 100 H.P.).
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1—Beloit hypoid enclosed drive 60 h.p. 5 to 1 ratio.

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2—30" diameter x 40" face, with bearings.
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B

Babcock & Wilcox Co. .... — Bahr Bros. Mfg. Co. .... — Bailey Meter Co. .... — Bauer Bros. Co. .... 11 Beloit Iron Works Co. .... — Bird Machine Co. .... 19 Bixby, R. W., Inc. .... — Black-Clawson Co. .... — Blaw-Knox Company .... — Bolton & Sons .... 62 Borden Co. .... — Bowsher Co., N. P. .... — Brandon Sales, Inc. .... — Broughton, A. E. & Co. .... — Brown Company .... — Buckeye Cellulose Corp. .... — Buell Engineering Co. .... 53 Buffalo Forge Co. .... — Buffalo Pumps, Inc. .... —

C

Cady E. L., & Co. .... — Cambridge Instrument Co. .... — Cameron Machine Co. .... — Capitol Products Corp., Read Standard Div. .... — Carthage Machine Co. .... — Central National Corp. .... — Chicago Bridge & Iron Co. ....Facing 35 Ciba Company .... — Cities Service Oil Co. .... — Clark-Aiken Company .... — Classified Advertising .... 66 Clearing House .... 66 Cleveland Crane & Engrg. Co. — Cleveland Worm & Gear Co. — Colonial Plastics Mfg. Co. .... — Columbia Cellulose .... — Columbia-Geneva Steel Div., U. S. Steel Corp. .... — Columbia-Southern Chem. Corp. Sub. of Pittsburgh Plate Glass Co. .... — Combustion Engrg. Co. .... — Corn Products Sales Co. .... 49 Crane Co. .... —

D

Davis, Frank H., Co. Inc. .... — DeZurik Shower Co. .... — Diamond Alkali Co. .... — Dicalite Div., Great Lakes Carbon Corp. .... — Dierks Paper Co. .... — Dilts Machine Works .... — Dixie Bearings Div. of Bearings, Inc. .... — Dodge Mfg. Co. .... — Door-Oliver .... 8 Dow Chemical Co. .... — Dow Corning Corp. .... — Dowell, Inc. .... — Draper Bros. Co. .... — Dryden Paper Co. Ltd. .... 21 du Pont, E. I., de Nemours & Co. Dyestuffs Dept. .... — du Pont, E. I., de Nemours & Co., Electrochemical Dept. .... — du Pont, E. I., de Nemours & Co., Pigments Dept. .... —

E

East Texas Pulp & Paper Co. — Eaton Manufacturing Co. .... — Ebasco Services, Inc. .... — Egan Frank W., & Co. .... 35 Eliximan Paper Core Co. .... — Elliott Company .... — Elwell Parker Elec. Co. .... — English China Clays Sales Corp. —

F

FabriValve Company .... 63 Fairbanks Morse & Co. .... — Falk Corporation .... — Farrel-Birmingham Co., Inc. .... — Farval Corporation .... — Ferguson, A. K. .... — Fife Manufacturing Co. .... — Fitchburg Screen Plate Co. .... — Foxboro Co. .... — Frederick Iron & Steel Co. .... — Freeport Sulphur Co. .... —

G

Gaspesia Sulphite Company Ltd. — Gates Rubber Company .... — Garden City Fan Co. .... — Garlock Packing Co. .... — Geigy Dyestuffs Div., Geigy Chemicals Corp. .... — General Dyestuffs Co. .... — General Electric Co. .... — General Tire & Rubber Co. .... 27 Gibbs-Brower Co. .... 66 Gilbert & Nash Co. .... — Glidden Company .... 55 Goodrich Industrial Prod. Co. 3 Goodyear Tire & Rubber Co. Back Cover Gottesman & Co. .... — Graton & Knight Co. .... — Graver Tank & Mfg. Co. .... — Grinnell Co., The .... — Gulf Oil Corporation .... — Gulf States Paper Corp. .... — Gurley, W. & L. E. .... —

H

Hagan Chemicals & Controls Corp. .... — Hamblet Machine Co. .... — Handling Devices Co. .... — Harbison-Walker Refractories . — Harris-Seybold .... — Hendrick Mfg. Co. .... — Hercules Powder Co. .... — Hooker Electrochemical Co. .. — Huber, J. M., Corp. .... 71 Hudson Sharp Machine Co. .. 61 Hungerford & Terry, Inc. .... 64 Huyck, F. C. & Sons .... —

I

Improved Machinery, Inc. .... — Ingersoll-Rand Co. .... — International Wire Works .. —

J

Jenkins Brothers .... — Johns-Manville Corp. .... — Johnson Corp. The .... — Johnson, Alvin H., & Co. .... 58 Jones, E. D., & Sons Co. 46

K

Kalamazoo Tank & Silo Co. . — Kamyr Inc. .... — Kidder Press Co. .... — Knox Woolen Co. .... — Koppers Company .... —

L

Langston, Samuel M., Co. .... — Link Belt Co. .... 25 Lockport Felt Co. .... — Lockwood Greene Engineers .. 60 Lodding Engineering .... 6 Lukens Steel Co. .... — Lummus Cotton Gin Co. .... — Lunkenheimer Co. .... — Lyddon & Co. .... —

M

Magnus Metal Co. .... — Magnaflux Corp. .... — Main, Charles T., Inc. .... 60 Manchester Machine Co. .... — Master Builders Co. .... — Mead Pulp Sales, Inc. .... 51 Merrick Scale Co. .... — Minneapolis-Honeywell .... — Monsanto Chemical Co. Plastics Div. .... — Moore & White Co. .... 64 Morden Machines Co. .... 2 Mt. Hope Mchy. Co. .... — Mt. Vernon Mills Inc. .... — Murray, D. J., Mfg. Co. .... —

N

Nash Engineering Co. .... 52 National Aluminate Co. .... — National Lead Co., Magnus Metal Div. .... — National Starch Products, Inc. 47 National Tube Div., U. S. Steel Corp. .... — Nelson Company .... — New Jersey Zinc Co. .... — Nichols Eng. & Research Corp. — Noble & Wood Mch. Co. .... — Nopco Chemical Co. .... — Northeastern Paper Sales .... 21 Northwest Paper Co. .... — Norton Co. 58

O

Oakite Products, Inc. .... — Ohio Injector Co. .... — Osborne Paper Mill Equipt. Corp. .... 68 Orrfoit Co. .... —

P

Paper Converting Machine Co. — Parsons & Whittemore .... — Patterson Fd. & Mch. Co. .... — Penick & Ford, Ltd. .... — Pennsalt Chemicals Corp. .... — Perkins, B. F., & Sons, Inc. .. — Perkins Goodwin Co. .... — Personnel Service Associates .. — Pioneer Paper Stock Co. .... 58 Pittsburgh Piping & Equip. .... — Poirier Control Co. .... — Potdevin Machine Co. .... 65 Powell Valves .... 10 Price & Pierce, Ltd. .... —

R

Railway Supply & Mfg. Co. .... — Raymond, Chas. P. Service, Inc. .... — Rayonier, Inc. .... — Read Standard Div., of Capitol Products Corp. .... — Ready Power Co. .... 54 Record Fdy. & Mch. Co. .... — Red Ray Mfg. Co. .... — Restigouche Corp. .... — Rice Barton Corp. .... — Riedel, Gus & Son .... 50 Riegel Paper Corp. .... — Rohm & Haas Co. .... — Ronningen-Petter Co. .... 50 Roots-Connersville Blower Div. — Roosevelt Paper Co. .... — Ross, J. J. Co. ....67 & 68 Ross-Midwest Fulton Co. .... — Ross Paper Machinery Co. .... — Ruderman Machy. Exchange 68 Rust Engineering Co. .... 60 Ryerson, Jos. T. & Son .... —

S

Sandoz Inc. .... — Sandy Hill Iron & Brass Works .... — Scapa Dyers Inc. .... 14 Seaboard Air Line R. R. Co. 23 Shartle Div., Black-Clawson Co. .... — Shawinigan Resins Corp. .... 16 Sheffield Corp. .... 62 Shell Chemical Corp. .... — Shuler & Benninghofen .... — Signode Steel Strapping Co. .. — Simplex Wire & Cable Co. .... — Sinclair Company .... — Sirrine, J. E., Co. .... — Smidth, F. L., & Co. .... — Soderhamn Mch. Mfg. Co. .... — Sonoco Products Co. .... 40 Southworth Machine Co. .... — Spraying Systems Co. .... 63 Sprout Waldron & Co. .... — Stadler Hurter & Co. .... 60 Staley Mfg. Company .... — Stanley Works .... — Stebbins Engrg., Co. .... — Stein, Hall & Co. .... — Stone & Webster Engrg. Corp. — Stowe-Woodward, Inc. .... 12 St. Regis Paper Co. .... — Sunday, Geo. M., Assoc. .... 66 Swenson Evaporator Co. Front Cover Swepco Tube Corp. .... —

T

Taylor Instrument Co.s .... — Taylor Stiles & Co. .... — Tennessee Coal & Iron Co. .. — Tennessee Corp. .... 65 Testing Machines .... 63 Texas Co. .... 4 Texas Gulf Sulphur Co. .... — Thiele Kaolin Co. .... — Thomas Paper Stock Co. .... 64 Titanium Pigment Corp. .... — Toledo Scale Corp. .... — Torrington Co. .... — Towmotor Corp. .... — Trent Tube Co. .... — Turner Halsey Co. .... — Tyer Rubber Co. .... —

U

United Carbon Co., Inc. .... — United Engrg. & Fdy. Co. .. — United Paper Machinery Corp. — U. S. Industrial Chem. Co., Div. of National Distillers & Chem. Corp. .... — U. S. Rubber Company .... — United States Steel Export .. — United States Steel Supply Co. — U. S. Steel Corp. .... —

V

Valley Iron Works .... 59 Vanderbilt, R. T., Co. .... — Virginia Smelting Co. .... —

W

Waldron, John, Corp. .... — Wallace & Tiernan Inc. .... — Walworth Co. .... — Weber, H. G., & Co. .... — West End Chemical Div. Stauffer Chem. Co. .... — Westvaco Chlor-Alkali Div., Food Mchy. & Chem. Corp. — Westinghouse Elec. Corp. .... — West Virginia Pulp & Paper Co. .... 64 Weyerhaeuser Timber Co. .... — Whiting Corp. .....Front Cover Wiggins Teape & Alex Pirie — Williams Apparatus Co. .... — Williams-Gray Co. .... — Wisconsin Wire Works .... — Worthington Corp. .... — Wyandotte Chem. Corp. .... — Wyatt Metal & Boiler Works —

Y

Yale & Towne Mfg. Co. .... — Yarnall-Waring Co. .... —

Z

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